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Coulomb Approximation Oscillator Strengths of Spectral Lines from Light and Medium Elements

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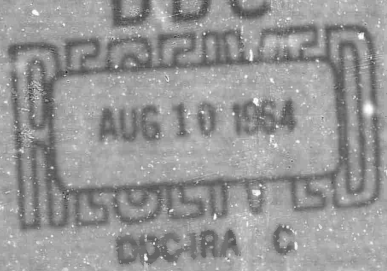

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ABSTRACT

This report contains a comprehensive table of absorption oscillator strengths for many spectral lines from various ionization stages of most elements between, and including, Li and Ca which have been calculated with the Coulomb approximation for the radial matrix elements, assuming LS-coupling. An average accuracy of 30 percent is suggested for visible lines emitted from neutral atoms. For ultraviolet lines, larger errors must be expected, with the accuracy improving as the degree of ionization increases. Absorption oscillator strengths for the lines in many of the strongest multiplets of the various spectra have also been included in the table. The lines and multiplets are arranged as in the multiplet tables for visible and ultraviolet lines by C. Moore (NBS Technical Note 36, and NBS Circular 488, Washington:U.S. Govt. Printing Office).

PROBLEM STATUS

This is a final report on one phase of the problem of quantitative spectroscopy in a plasma. Work on other phases of the problem continues.

AUTHORIZATION

NRL Problem H01-11
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COULOMB APPROXIMATION OSCILLATOR STRENGTHS OF SPECTRAL LINES FROM LIGHT AND MEDIUM ELEMENTS

SUMMARY

This report contains, in tabulated form, the results of extensive machine calculations* of absorption oscillator strengths for spectral lines from two (except helium) and more electron systems. (For helium the Hartree-Fock results† should be used, and for the members of the one-electron sequence the exact hydrogen oscillator strengths are to be used.‡) The calculations are based on Coulomb approximation radial matrix elements obtained according to Bates and Damgaard.§ Effective quantum numbers were calculated from the empirical energy values,ª and relative line and multiplet strengths were calculated from Rohrlich's formulas** using the table of Racah coefficients from Simon, et al.†† Bates and Damgaard's table for the $\mathcal{G}$-function was replaced by their analytical expression, but their tables for the $\mathcal{A}$-functions were used in the original form, except that it was necessary to extrapolate in quite a number of cases. This extrapolation is especially critical for vacuum ultraviolet lines of neutral atoms.

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*The IBM-7090 code was prepared by Mr. W.G. Hall and Mrs. J. Beiman at the National Bureau of Standards.

†E. Trefftz, A. Schlüter, K.H. Dettmar, and K. Jörgens, Z. Astrophysik 44:1 (1957).

‡H.A. Bethe and E.E. Salpeter, "Quantum Mechanics of One and Two Electron Systems," Berlin:Springer and New York:Academic Press (1957).

§D.R. Bates and A. Damgaard, Phil. Trans. Roy. Soc. (London), A242:101 (1949).

ªC.E. Moore, "Atomic Energy Levels," NBS Circular 467, Vol. I, Washington:U.S. Govt. Printing Office (1949).

**F. Rohrlich, Astrophys. J. 129:441 (1959).

††A. Simon, J.H. Van der Sluis, and L.C. Biedenharn, "Tables of Racah Coefficients," Oak Ridge National Laboratory, Technical Report ORNL-1679 (1954), Oak Ridge, Tennessee.

TABLE OF ABSORPTION OSCILLATOR STRENGTHS $f_{J,J'}$ FOR VISIBLE LINES FROM THE COULOMB APPROXIMATION

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J'}$
Li I	6707.7	(1)	1.84	1/2-3/2	0.498
	6707.9		1.84	1/2-1/2	0.249
	3232.6	(2)	3.82	1/2-3/2	0.00346
	3232.6		3.82	1/2-1/2	0.00173
	8126.5	(3)	3.36	3/2-1/2	0.110
	8126.5		3.36	1/2-1/2	0.110
	6103.6	(4)	3.86	3/2-5/2	0.582
	6103.6		3.86	3/2-3/2	0.0646
	6103.6		3.86	1/2-3/2	0.646
	4971.9	(5)	4.32	3/2-1/2	0.0125
	4971.9		4.32	1/2-1/2	0.0125
	4603.0	(6)	4.52	3/2-5/2	0.109
	4603.0		4.52	3/2-3/2	0.0122
	4603.0		4.52	1/2-3/2	0.112
Li II	5484.6	(1)	61.02	1 - 2	0.170
	5484.6		61.02	1 - 1	0.102
	5484.6		61.02	1 - 0	0.0340
	3684.1	(2)	71.83	1 - 2	0.105
	3684.1		71.83	1 - 1	0.0628
	3684.1		71.83	1 - 0	0.0209
	4156.3	(3)	71.95	0 - 1	0.267
	4881.3	(4)	71.60	2 - 1	0.0851
	4881.3		71.60	1 - 1	0.0851
	4881.3		71.60	0 - 1	0.0851
	4325.7	(5)	71.92	2 - 3	0.426
	4325.7		71.92	2 - 2	0.0761
	4325.7		71.92	2 - 1	0.00508
	4325.7		71.92	1 - 2	0.381
	4325.7		71.92	1 - 1	0.127
	4325.7		71.92	0 - 1	0.508
Be I	3321.3	(1)	6.43	2 - 1	0.0342
	3321.1		6.43	1 - 1	0.0342
	3321.0		6.43	0 - 1	0.0342
	8254.1	(2)	6.75	1 - 0	0.130
	4572.7	(3)	7.95	1 - 2	0.191
	4407.9	(4)	8.05	1 - 0	0.00869
	3813.4	(5)	8.49	1 - 2	0.0837
	3736.3	(6)	8.56	1 - 0	0.00267
	3515.5	(7)	8.77	1 - 2	0.0409
Be II	3130.4	(1)	3.94	1/2-3/2	0.333
	3131.1		3.94	1/2-1/2	0.166
	3274.6	(2)	14.66	1/2-3/2	0.0460
	3274.6		14.66	1/2-1/2	0.0230
Be II	5270.8	(3)	14.25	3/2-1/2	0.135
	5270.3		14.25	1/2-1/2	0.135
	4361.0	(4)	14.74	3/2-5/2	0.467
	4361.0		14.74	3/2-3/2	0.0519
	4360.7		14.74	1/2-3/2	0.519
	3241.8	(5)	15.72	3/2-1/2	0.0216
	4673.5	(6)	14.75	5/2-7/2	0.967
	4673.5		14.75	5/2-5/2	0.0483
	4673.5		14.75	3/2-5/2	1.015
B II	4122.0	(2)	21.59	2 - 3	0.808
	4122.0		21.59	2 - 2	0.101
	4122.0		21.59	1 - 2	0.910
	4122.0		21.59	3 - 4	0.835
	4122.0		21.59	3 - 3	0.0722
	4122.0		21.59	3 - 2	0.00206
B III	4243.6	(1)	32.89	3/2-5/2	0.451
	4243.6		32.89	3/2-3/2	0.0501
	4243.6		32.89	1/2-3/2	0.500
	4487.5	(2)	32.89	5/2-7/2	0.846
	4487.5		32.89	5/2-5/2	0.0423
	4487.5		32.89	3/2-5/2	0.888
C I	10691.4	(1)	8.61	2 - 3	0.432
	10683.2		8.61	1 - 2	0.385
	10685.4		8.60	0 - 1	0.512
	10729.6		8.61	2 - 2	0.0768
	10707.4		8.60	1 - 1	0.128
	10754.1		8.60	2 - 1	0.00511
	9658.5	(2)	8.73	2 - 1	0.113
	9620.9		8.73	1 - 1	0.113
	9603.1		8.73	0 - 1	0.113
	9094.9	(3)	8.81	2 - 2	0.265
	9078.3		8.81	1 - 1	0.0882
	9111.9		8.81	2 - 1	0.0882
	9088.6		8.81	1 - 0	0.118
	9061.5		8.81	1 - 2	0.147
	9062.5		8.81	0 - 1	0.353
	5041.7	(4)	9.90	2 - 3	0.00782
	5039.1		9.90	1 - 2	0.00752
	5039.1		9.90	0 - 1	0.0105
	4826.7	(5)	10.01	2 - 1	0.000688
	4817.3		10.01	1 - 1	0.000716
	4812.8		10.01	0 - 1	0.000729
C I	4771.7	(6)	10.04	2 - 2	0.00468
	4766.6		10.04	1 - 1	0.00149
	4775.9		10.04	2 - 1	0.00146
	4770.0		10.04	1 - 0	0.00188
	4762.4		10.04	1 - 2	0.00266
	4762.4		10.04	0 - 1	0.00604
	4065.1	(7)	10.49	2 - 3	0.000046
	4064.2		10.49	1 - 2	0.000142
	4064.2		10.49	0 - 1	0.000320
	9405.8	(9)	8.96	1 - 2	0.616
	8335.2	(10)	9.13	1 - 0	0.125
	5380.2	(11)	9.95	1 - 1	0.00514
	5052.1	(12)	10.09	1 - 2	0.0162
	4932.0	(13)	10.15	1 - 0	0.00764
	4371.3	(14)	10.47	1 - 1	0.00286
	4269.0	(16)	10.54	1 - 2	0.00318
	4231.4	(17)	10.57	1 - 0	0.00207
	11330.4	(19)	9.59	1 - 2	0.647
	10548.0	(20)	9.67	1 - 1	0.107
	6828.5	(21)	10.31	1 - 2	0.00610
	6587.8	(22)	10.37	1 - 1	0.0161
	11894.9	(23)	9.65	3 - 2	0.139
	11894.9		9.64	2 - 1	0.105
	11880.4		9.64	1 - 0	0.0776
	11849.3		9.65	2 - 2	0.0346
	11863.0		9.64	1 - 1	0.0580
	11754.0	(24)	9.66	3 - 4	0.702
	11754.0		9.66	2 - 3	0.677
	11747.5		9.65	1 - 2	0.761
	11801.8		9.66	3 - 3	0.0605
	11667.1	(25)	9.67	3 - 3	0.122
	11631.6		9.67	2 - 2	0.095
	11609.9		9.67	1 - 1	0.103
	11677.0		9.67	3 - 2	0.0153
	11638.6		9.67	2 - 1	0.0206
	11619.0		9.67	2 - 3	0.0214
	11602.9		9.67	1 - 2	0.0343
	7118.5	(26)	10.34	1 - 2	0.0144
	11667.1	(29)	9.79	1 - 2	0.533
	11656.0		9.79	1 - 1	0.320
	12614.8	(30)	9.79	2 - 2	0.183
	12565.0		9.79	1 - 1	0.0610
	12602.6		9.79	2 - 1	0.0610
	12565.0		9.79	1 - 0	0.0813
	12582.3		9.79	1 - 2	0.102
	12551.0		9.79	0 - 1	0.244
	8018.0	(31)	10.35	0 - 1	0.00254

1) The number in parentheses is the multiplet number.
2) Excitation potential of the upper level of the line [in Volts].
3) Total angular momentum quantum number of lower and upper levels.

	Wavelength [Å][4]		$E^{a)}$	$J-J'^{a)}$	$f_{J,J}$
C I	7850.0	(32)	10.38	0 - 1	0.00652
C II	6578.0	(2)	16.26	1/2-3/2	0.553
	6582.9		16.26	1/2-1/2	0.276
	7236.2	(3)	17.97	3/2-5/2	0.530
	7231.1		17.97	1/2-3/2	0.589
	3920.7	(4)	19.41	3/2-1/2	0.134
	3919.0		19.41	1/2-1/2	0.134
	5890.0	(5)	20.06	5/2-3/2	0.105
	5891.7		20.06	3/2-1/2	0.0878
	4267.3	(6)	20.86	5/2-7/2	0.894
	4267.0		20.86	3/2-5/2	0.939
	3361.1	(7)	21.64	5/2-3/2	0.0123
	3361.8		21.64	3/2-1/2	0.0703
	2992.6	(8)	22.09	3/2-5/2	0.169
	5536.0	(10)	21.64	1/2-3/2	0.0564
	5536.0		21.64	1/2-1/2	0.0286
	5336.7	(11)	22.38	3/2-1/2	0.0306
	6783.8	(14)	22.44	5/2-7/2	0.340
	6779.7		22.44	3/2-5/2	0.267
	6780.3		22.43	1/2-3/2	0.212
	6800.5		22.44	5/2-5/2	0.0762
	6791.3		22.43	3/2-3/2	0.135
	6787.1		22.43	1/2-1/2	0.212
	6812.2		22.43	5/2-3/2	0.00845
	6798.0		22.43	3/2-1/2	0.0211
	5662.5	(15)	22.80	5/2-3/2	0.104
	5648.1		22.80	3/2-3/2	0.104
	5640.5		22.80	1/2-3/2	0.104
	5145.2	(16)	23.02	5/2-5/2	0.239
	5139.2		23.02	3/2-3/2	0.0456
	5137.3		23.01	1/2-1/2	0.0569
	5151.1		23.02	5/2-3/2	0.102
	5143.5		23.01	3/2-1/2	0.142
	5133.3		23.02	3/2-5/2	0.154
	5133.0		23.02	1/2-3/2	0.285
	6115.2	(19)	24.02	3/2-1/2	0.126
	7119.5	(20)	24.17	7/2-9/2	0.404
	7115.1		24.17	5/2-7/2	0.369
	7112.4		24.17	3/2-5/2	0.362
	7112.4		24.17	1/2-3/2	0.452
	7133.5		24.17	7/2-7/2	0.0461
	7125.5		24.17	5/2-5/2	0.0786
	7119.5		24.17	3/2-3/2	0.0903
	6750.2	(21)	24.27	7/2-7/2	0.0749
	6738.4		24.27	5/2-5/2	0.0504
	6730.8		24.27	3/2-3/2	0.0350
	6726.8		24.26	1/2-1/2	0.0438
	6754.8		24.27	7/2-5/2	0.0125
	6742.1		24.27	5/2-3/2	0.0204
C II	6733.6	(21)	24.26	3/2-1/2	0.0219
	6733.6		24.27	5/2-7/2	0.0167
	6726.8		24.27	3/2-5/2	0.0306
	5856.1	(22)	24.55	7/2-5/2	0.00719
	5836.3		24.55	5/2-3/2	0.00504
	5823.1		24.55	3/2-1/2	0.00301
	5843.8		24.55	5/2-5/2	0.00216
	5827.8		24.55	3/2-3/2	0.00385
	5817.9		24.55	1/2-1/2	0.00602
	3589.7	(23)	25.88	7/2-5/2	0.107
	3590.9		25.87	5/2-3/2	0.0752
	3590.9		25.87	3/2-1/2	0.0449
	3585.0		25.88	5/2-5/2	0.0319
	3587.7		25.87	3/2-3/2	0.0572
	3588.9		25.87	1/2-1/2	0.0896
	3585.8		25.88	3/2-5/2	0.00531
	3585.8		25.87	1/2-3/2	0.0178
	6098.6	(24)	24.50	3/2-5/2	0.463
	6095.4		24.50	1/2-3/2	0.514
	6102.6		24.50	3/2-3/2	0.0514
	4964.9	(25)	24.96	3/2-3/2	0.187
	4954.2		24.96	1/2-1/2	0.150
	4959.5		24.96	3/2-1/2	0.0374
	4959.5		24.96	1/2-3/2	0.0747
	7063.4	(26)	24.55	3/2-5/2	0.314
	7052.9		24.55	3/2-3/2	0.210
	7045.8		24.55	3/2-1/2	0.105
	4009.9	(27)	25.88	3/2-5/2	0.0705
	4017.3		25.87	3/2-3/2	0.0473
	4021.1		25.87	3/2-1/2	0.0236
	4317.4	(28)	25.88	5/2-5/2	0.115
	4322.0		25.87	3/2-3/2	0.0220
	4325.9		25.87	5/2-3/2	0.0495
	4325.9		25.87	3/2-1/2	0.0689
	4313.5		25.88	3/2-5/2	0.0737
	4318.9		25.87	1/2-3/2	0.137
	3039.7	(29)	27.34	3/2-5/2	0.0835
	5257.4	(30)	26.52	9/2-7/2	0.0801
	5259.6		26.52	7/2-5/2	0.0689
	5259.6		26.51	5/2-3/2	0.0601
	5259.6		26.51	3/2-1/2	0.0564
	5249.4		26.52	7/2-7/2	0.0114
	5253.6		26.52	5/2-5/2	0.0195
	3952.1	(32)	27.30	9/2-9/2	0.0632
	3948.2		27.30	7/2-7/2	0.0525
	3946.4		27.30	3/2-5/2	0.0138
	3945.1		27.30	5/2-7/2	0.0123
	3876.4	(33)	27.35	7/2-9/2	0.688
	3876.7		27.35	5/2-7/2	0.690
C II	3876.1	(33)	27.35	3/2-5/2	0.773
	3880.6		27.35	9/2-9/2	0.0501
	3879.6		27.35	7/2-7/2	0.0819
	3878.2		27.35	5/2-5/2	0.0829
	5478.6	(34)	26.52	7/2-7/2	0.0191
	5044.8	(35)	26.71	7/2-5/2	0.0457
	5047.2		26.71	5/2-3/2	0.0321
	4076.0	(36)	27.30	7/2-9/2	0.713
	4074.5		27.30	5/2-7/2	0.652
	4074.9		27.30	1/2-3/2	0.797
	3980.4	(37)	27.37	7/2-7/2	0.0819
	3973.8		27.37	5/2-5/2	0.0548
	3969.4		27.37	3/2-3/2	0.0380
	3978.9		27.37	5/2-7/2	0.0182
	3972.4		27.37	3/2-5/2	0.0133
	3968.6		27.37	1/2-3/2	0.0474
	4411.5	(39)	27.29	5/2-7/2	0.819
	4411.2		27.29	3/2-5/2	0.860
	4296.1	(42)	27.37	5/2-5/2	0.0970
	4286.0		27.38	3/2-3/2	0.0931
	3049.4	(43)	28.54	3/2-5/2	0.144
	5907.4	(44)	26.64	5/2-3/2	0.0559
	5914.9		26.64	3/2-3/2	0.0561
	5919.6		26.64	1/2-3/2	0.0562
	4374.3	(45)	27.37	5/2-7/2	0.762
	4372.5		27.37	3/2-5/2	0.599
	4371.6		27.37	1/2-3/2	0.475
	4368.1		27.37	1/2-1/2	0.476
	3059.2	(47)	28.58	5/2-7/2	0.136
	4734.8	(48)	27.29	7/2-7/2	0.0781
	4727.2		27.29	5/2-5/2	0.0770
	4618.9	(50)	27.36	5/2-7/2	0.923
	5118.6	(51)	27.37	3/2-5/2	0.970
	5114.1		27.38	1/2-3/2	1.076
C III	4647.4	(1)	32.05	1 - 2	0.423
	4650.2		32.05	1 - 1	0.253
	4651.4		32.05	1 - 0	0.0845
	5696.0	(2)	34.13	1 - 2	0.407
	6744.2	(3)	39.88	2 - 3	0.254
	6730.7		39.87	1 - 2	0.227
	6727.1		39.87	0 - 1	0.303
	5272.6	(4)	40.39	2 - 1	0.0800
	5253.6		40.39	1 - 1	0.0802
	5244.5		40.39	0 - 1	0.0803
	4665.9	(5)	40.69	2 - 2	0.205
	4673.9		40.69	2 - 1	0.0683
	4663.5		40.69	1 - 0	0.0911
	4325.7	(7)	41.12	1 - 2	0.506
	3170.2	(8)	42.37	0 - 1	0.147

	Wavelength [Å][4]		$E^{a)}$	J-J'[a]	$f_{J'J}$
C III	4516.9	(9)	41.95	2 - 1	0.169
	4516.0		41.95	1 - 1	0.169
	4516.0		41.95	0 - 1	0.169
	3609.6	(10)	42.64	2 - 3	0.257
	3609.0		42.64	0 - 1	0.308
	4388.2	(14)	42.48	3 - 2	0.0463
	4383.2		42.48	2 - 2	0.0115
	4383.2		42.48	2 - 1	0.0345
	4380.0		42.48	1 - 1	0.0191
	4380.0		42.48	1 - 0	0.0254
	3889.2	(15)	42.84	3 - 4	0.531
	3886.0		42.84	2 - 3	0.512
	3883.8		42.84	1 - 2	0.575
	4122.1	(17)	42.79	1 - 2	0.443
	6871.7	(19)	41.67	3 - 3	0.0417
	6862.9		41.67	2 - 2	0.0326
	6857.3		41.67	1 - 1	0.0352
	5894.1	(20)	41.97	3 - 2	0.00385
	5871.6		41.98	2 - 1	0.00290
	5857.9		41.98	1 - 0	0.00215
	5249.6	(23)	42.37	2 - 1	0.128
	4056.1	(24)	43.07	2 - 3	0.500
C IV	5801.5	(1)	39.51	1/2-3/2	0.319
	5812.1		39.51	1/2-1/2	0.159
	3936.0	(2)	58.12	1/2-1/2	0.0788
	3936.0		58.12	1/2-3/2	0.158
	5023.0	(3)	57.87	3/2-1/2	0.176
	5021.0		57.87	1/2-1/2	0.176
	4441.8	(4)	58.19	1/2-3/2	0.516
	4789.0	(5)	58.12	3/2-1/2	0.0586
	4647.0	(6)	58.19	3/2-5/2	0.837
	4665.0	(7)	58.19	5/2-3/2	0.0225
	6592.0	(10)	59.74	1/2-1/2	0.0858
	6592.0		59.74	1/2-3/2	0.172
	4737.0	(12)	60.80	3/2-1/2	0.0174
N I	8680.2	(1)	11.71	5/2-7/2	0.413
	8683.4		11.71	3/2-5/2	0.324
	8686.1		11.70	1/2-3/2	0.242
	8718.8		11.71	5/2-5/2	0.0926
	8711.7		11.70	3/2-3/2	0.164
	8703.2		11.70	1/2-1/2	0.242
	8747.4		11.70	5/2-3/2	0.0103
	8728.9		11.70	3/2-1/2	0.0256
	8216.3	(2)	11.79	5/2-5/2	0.227
	8210.6		11.79	3/2-3/2	0.0432
	8200.3		11.79	1/2-1/2	0.0508
	8242.3		11.79	5/2-3/2	0.0971
	8223.1		11.79	3/2-1/2	0.135

	Wavelength [Å][4]		$E^{a)}$	J-J'[a]	$f_{J'J}$
N I	8184.8	(2)	11.79	3/2-5/2	0.146
	8188.0		11.79	1/2-3/2	0.254
	7468.3	(3)	11.94	5/2-3/2	0.116
	7442.3		11.94	3/2-3/2	0.116
	7423.6		11.94	1/2-3/2	0.116
	4253.5	(4)	13.19	5/2-7/2	0.00114
	4254.7		13.19	3/2-5/2	0.000601
	4254.7		13.18	1/2-3/2	0.000350
	4223.0	(5)	13.21	5/2-5/2	0.00107
	4230.4		13.21	5/2-3/2	0.000591
	4224.7		13.21	3/2-1/2	0.000784
	4214.7		13.21	3/2-5/2	0.00114
	4215.9		13.21	1/2-3/2	0.00176
	4151.5	(6)	13.26	5/2-3/2	0.00301
	4143.4		13.26	3/2-3/2	0.00305
	4137.6		13.26	1/2-3/2	0.00308
	9392.8	(7)	11.96	3/2-5/2	0.502
	9386.8		11.95	1/2-3/2	0.556
	9460.7		11.95	3/2-3/2	0.0555
	8629.2	(8)	12.07	3/2-3/2	0.296
	8594.0		12.07	1/2-1/2	0.237
	8655.9		12.07	3/2-1/2	0.0591
	8567.7		12.07	1/2-3/2	0.118
	4935.0	(9)	13.14	3/2-1/2	0.00243
	4914.9		13.14	1/2-1/2	0.00230
	9060.6	(15)	12.91	1/2-3/2	0.581
	9028.9		12.92	1/2-1/2	0.290
	6008.5	(16)	13.61	1/2-3/2	0.0390
	5999.5		13.61	1/2-1/2	0.0205
	11294.0	(17)	12.81	7/2-5/2	0.142
	11313.8		12.80	5/2-3/2	0.101
	11329.0		12.79	3/2-1/2	0.0704
	11227.5		12.81	5/2-5/2	0.0423
	10113.4	(18)	12.93	7/2-9/2	0.676
	10113.4		12.93	5/2-7/2	0.617
	10113.4		12.92	3/2-5/2	0.603
	10113.4		12.92	1/2-3/2	0.752
	10164.5		12.93	7/2-7/2	0.0772
	10147.3		12.92	5/2-5/2	0.131
	9862.5	(19)	12.96	7/2-7/2	0.117
	9821.8		12.96	5/2-5/2	0.0784
	6645.0	(20)	13.57	7/2-5/2	0.0157
	6653.4		13.56	5/2-3/2	0.0112
	6656.6		13.56	3/2-1/2	0.00666
	6622.5		13.57	5/2-5/2	0.00476
	6637.0		13.56	3/2-3/2	0.00849
	6646.5		13.56	1/2-1/2	0.0133
	6482.7	(21)	13.62	7/2-9/2	0.0355
	6484.9		13.61	5/2-7/2	0.0287

	Wavelength [Å][4]		$E^{a)}$	J-J'[a]	$f_{J'J}$
N I	6483.8	(21)	13.61	3/2-5/2	0.0260
	6481.7		13.60	1/2-3/2	0.0313
	6506.5		13.61	7/2-7/2	0.00352
	6499.5		13.61	5/2-5/2	0.00559
	6491.3		13.60	3/2-3/2	0.00621
	6468.3	(22)	13.62	7/2-7/2	0.00661
	6468.3		13.62	5/2-5/2	0.00400
	6457.9		13.61	3/2-3/2	0.00272
	6441.7	(23)	13.63	7/2-5/2	0.000596
	6437.0		13.62	3/2-1/2	0.00213
	6420.5		13.63	5/2-5/2	0.00182
	5616.5	(24)	13.91	7/2-5/2	0.0537
	5623.2		13.90	5/2-3/2	0.00373
	5625.4		13.90	3/2-1/2	0.00214
	5560.4	(25)	13.93	7/2-9/2	0.00787
	5564.4		13.92	5/2-7/2	0.00441
	5545.1	(26)	13.94	7/2-5/2	0.000148
	12186.9	(27)	12.81	5/2-5/2	0.111
	12232.9		12.80	3/2-3/2	0.0213
	12288.0		12.80	5/2-3/2	0.0483
	12128.6		12.81	3/2-5/2	0.0710
	12203.4		12.80	1/2-3/2	0.133
	10539.0	(28)	12.96	5/2-7/2	0.554
	10506.5		12.96	3/2-5/2	0.435
	10548.0		12.96	5/2-5/2	0.125
	6945.2	(29)	13.57	5/2-5/2	0.0115
	6979.1		13.56	5/2-3/2	0.00483
	6926.9		13.57	3/2-5/2	0.00741
	6752.4	(30)	13.62	5/2-7/2	0.0247
	6758.6		13.62	3/2-5/2	0.0172
	6723.1	(31)	13.63	5/2-5/2	0.00848
	6733.5		13.62	1/2-1/2	0.00169
	6706.2		13.63	3/2-5/2	0.00552
	6741.3		13.62	3/2-1/2	0.00420
	5829.5	(32)	13.91	5/2-5/2	0.00383
	5841.0		13.90	3/2-3/2	0.000682
	5854.2		13.90	5/2-3/2	0.00153
	5816.5		13.91	3/2-5/2	0.00246
	5752.6	(33)	13.94	5/2-5/2	0.00185
	12186.9	(34)	12.96	3/2-5/2	0.465
	12288.0		12.95	3/2-3/2	0.308
	12327.7		12.95	3/2-1/2	0.153
	5747.4	(35)	14.09	3/2-5/2	0.00117
	12467.8	(36)	12.95	5/2-7/2	0.738
	12461.2		12.94	3/2-5/2	0.769
	12582.3		12.94	5/2-5/2	0.0366
	12074.1	(37)	12.98	5/2-5/2	0.132
	11997.?		12.98	3/2-3/2	0.127
	12107.4		12.98	5/2-3/2	0.00944

	Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J,J}$
N II	5679.6	(3)	20.58	2 - 3	0.357
	5666.6		20.56	1 - 2	0.319
	5676.0		20.56	0 - 1	0.424
	5710.8		20.56	2 - 2	0.0634
	5686.2		20.56	1 - 1	0.106
	5730.7		20.56	2 - 1	0.00421
	5045.1	(4)	20.85	2 - 1	0.0974
	5010.6		20.85	1 - 1	0.0978
	5002.7		20.85	0 - 1	0.0979
	4630.5	(5)	21.07	2 - 2	0.239
	4613.9		21.06	1 - 1	0.0798
	4643.1		21.06	2 - 1	0.0796
	4621.4		21.06	1 - 0	0.106
	4601.5		21.07	1 - 2	0.133
	4607.2		21.06	0 - 1	0.320
	6482.1	(8)	20.32	1 - 1	0.220
	3995.0	(12)	21.51	1 - 2	0.613
	3437.2	(13)	22.01	1 - 0	0.135
	4447.0	(15)	23.10	1 - 2	0.587
	3919.0	(17)	23.47	1 - 1	0.229
	3006.9	(18)	24.43	- 1	0.0732
	5005.1	(19)	23.04	3 - 4	0.557
	5001.5		23.03	2 - 3	0.537
	5001.1		23.02	1 - 2	0.603
	5025.7		23.03	3 - 3	0.0478
	5016.4		23.02	2 - 2	0.0669
	5040.8		23.02	3 - 2	0.00136
	4803.3	(20)	23.15	3 - 3	0.102
	4788.1		23.14	2 - 2	0.0796
	4779.7		23.14	1 - 1	0.0860
	4810.3		23.14	3 - 2	0.0127
	4793.7		23.14	2 - 1	0.0172
	4781.2		23.15	2 - 3	0.0179
	4774.2		23.14	1 - 2	0.0287
	4507.6	(21)	23.31	3 - 2	0.00835
	4477.7		23.32	2 - 1	0.00629
	4460.0		23.32	1 - 0	0.00467
	4488.2		23.31	2 - 2	0.00209
	4465.5		23.32	1 - 1	0.00350
	3328.8	(22)	24.28	3 - 2	0.111
	3331.3		24.27	2 - 1	0.0840
	3330.3		24.26	1 - 0	0.0624
	3318.1		24.28	2 - 2	0.0275
	3324.6		24.27	1 - 1	0.0464
	5007.3	(24)	23.31	1 - 2	0.439
	4994.4		23.32	1 - 1	0.265
	4987.4		23.32	1 - 0	0.0883
	3593.6	(26)	24.28	1 - 2	0.0739
	3609.1		24.27	1 - 1	0.0451

	Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J,J}$
N II	3615.9	(26)	24.26	1 - 0	0.0151
	5941.7	(28)	23.15	2 - 3	0.424
	5931.8		23.14	1 - 2	0.378
	5927.8		23.14	0 - 1	0.504
	5952.4		23.14	2 - 2	0.0755
	5940.3		23.14	1 - 1	0.126
	5960.9		23.14	2 - 1	0.00502
	5495.7	(29)	23.31	2 - 2	0.141
	5462.6		23.32	1 - 1	0.0472
	5480.1		23.32	2 - 1	0.0471
	5454.3		23.32	1 - 0	0.0631
	5478.1		23.31	1 - 2	0.0784
	5452.1		23.32	0 - 1	0.189
	3838.4	(30)	24.28	2 - 2	0.114
	3847.4		24.27	1 - 1	0.0384
	3856.1		24.27	2 - 1	0.0386
	3855.1		24.26	1 - 0	0.0516
	3829.8		24.28	1 - 2	0.0631
	3842.2		24.27	0 - 1	0.153
	6610.6	(31)	23.37	2 - 3	0.571
	6284.3	(32)	23.47	2 - 1	0.00732
	4227.7	(33)	23.43	2 - 1	0.171
	5104.5	(34)	24.43	0 - 1	0.222
	3023.8	(35)	26.09	0 - 1	0.0967
	6147.8	(36)	25.04	4 - 3	0.123
	6173.4		25.03	3 - 2	0.110
	6170.2		25.03	2 - 1	0.104
	6136.9		25.04	3 - 3	0.0136
	6150.9		25.03	2 - 2	0.0192
	6114.6		25.03	2 - 3	0.000540
	4095.9	(38)	26.06	4 - 4	0.0671
	4082.9		26.05	3 - 3	0.0600
	4076.8		26.05	2 - 2	0.0634
	4082.3		26.06	3 - 4	0.00573
	4073.1		26.05	2 - 3	0.00791
	4043.5	(39)	26.08	3 - 4	0.763
	4035.1		26.08	2 - 3	0.812
	4057.0		26.08	4 - 4	0.0397
	4044.8		26.08	3 - 3	0.0509
	6630.5	(41)	24.96	2 - 1	0.104
	4176.2	(42)	26.05	2 - 3	0.818
	6504.9	(45)	25.04	3 - 3	0.0298
	6533.0		25.03	2 - 2	0.0235
	6545.2		25.03	1 - 1	0.0254
	6545.2		25.03	3 - 2	0.00377
	6492.0		25.04	2 - 3	0.00520
	6522.3		25.03	1 - 2	0.00843
	6340.7	(46)	25.09	3 - 2	0.0959
	6357.0		25.08	2 - 1	0.0724

	Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J,J}$
N II	6357.0	(46)	25.08	1 - 0	0.0536
	6328.6		25.09	2 - 2	0.0239
	6347.1		25.08	1 - 1	0.0401
	4241.8	(48)	26.06	3 - 4	0.762
	4237.0		26.05	2 - 3	0.737
	4236.9		26.05	1 - 2	0.829
	4179.7	(50)	26.10	3 - 3	0.0906
	4173.5		26.10	2 - 2	0.0707
	4156.8		26.11	1 - 1	0.0756
	4160.8		26.11	2 - 1	0.0151
	4173.8		26.10	2 - 3	0.0158
	7139.8	(52)	25.04	2 - 3	0.00355
	7217.0		25.03	1 - 2	0.00321
	7259.3		25.03	0 - 1	0.00431
	7188.7		25.03	2 - 2	0.000639
	6942.9	(53)	25.09	2 - 2	0.0457
	7003.0		25.08	1 - 1	0.0154
	6976.8		25.08	2 - 1	0.0153
	7015.3		25.08	1 - 0	0.0206
	6967.6		25.09	1 - 2	0.0255
	7015.3		25.08	0 - 1	0.0618
	6812.3	(54)	25.13	2 - 1	0.0788
	6836.2		25.13	1 - 1	0.0792
	4432.7	(55)	26.10	2 - 3	0.816
	4442.0		26.10	1 - 2	0.730
	4433.5		26.11	0 - 1	0.968
	4431.8		26.10	2 - 2	0.146
	4428.0		26.11	1 - 1	0.244
	6242.5	(57)	25.35	3 - 2	0.115
	4530.4	(59)	26.10	3 - 4	0.909
	6167.8	(60)	25.47	1 - 0	0.0591
	4677.9	(62)	26.11	1 - 2	1.013
	5535.4	(63)	27.61	3 - 4	0.336
	5530.3		27.61	2 - 3	0.244
	5526.3		27.60	1 - 2	0.152
	5552.0		27.61	3 - 3	0.0869
	5543.5		27.60	2 - 2	0.152
	5535.4		27.60	1 - 1	0.196
	5565.3		27.60	3 - 2	0.0124
	5552.5		27.60	2 - 1	0.0390
	5540.2		27.59	1 - 0	0.0868
	5012.0	(64)	27.84	3 - 3	0.195
	5005.1		27.84	2 - 2	0.0244
	4997.2		27.84	1 - 1	0.0732
	5023.1		27.84	3 - 2	0.0974
	5011.2		27.84	2 - 1	0.132
	4994.4		27.84	2 - 3	0.137
	4991.2		27.84	1 - 2	0.220
	4145.8	(65)	28.36	3 - 2	0.118

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J}$
N II	4133.7	(65)	28.36	2 - 2	0.118
	4124.1		28.36	1 - 2	0.118
	5175.9	(66)	29.99	3 - 4	0.446
	5173.4		29.99	2 - 3	0.399
	5172.3		29.98	1 - 2	0.388
	5172.3		29.98	0 - 1	0.581
	5190.4		29.99	4 - 4	0.0692
	5185.0		29.99	3 - 3	0.125
	5180.3		29.98	2 - 2	0.166
	5199.5		29.98	4 - 3	0.00461
	4860.4	(67)	30.15	4 - 3	0.00757
	4718.4	(68)	30.23	4 - 4	0.0989
	4709.5		30.23	3 - 3	0.0594
	4702.6		30.22	2 - 2	0.0297
	4721.6		30.23	4 - 3	0.0198
	4712.1		30.22	3 - 2	0.0339
	4704.3		30.22	2 - 1	0.0415
	4698.6		30.22	1 - 0	0.0396
	4706.4		30.23	3 - 4	0.0255
	4700.1		30.23	2 - 3	0.0475
	4695.9		30.22	1 - 2	0.0693
	5351.2	(69)	30.15	3 - 3	0.120
	5327.5		30.16	2 - 2	0.0151
	5313.4		30.16	1 - 1	0.0453
	5340.2		30.16	3 - 2	0.0601
	5321.0		30.16	2 - 1	0.0814
	5338.7		30.15	2 - 3	0.0840
	5321.0		30.16	1 - 2	0.136
	5179.5	(70)	30.23	3 - 4	0.435
	5171.5		30.23	2 - 3	0.316
	5168.2		30.22	1 - 2	0.197
	5183.2		30.23	3 - 3	0.113
	5174.5		30.22	2 - 2	0.197
	5170.1		30.22	1 - 1	0.254
	5186.2		30.22	3 - 2	0.0161
	6888.7	(71)	30.15	2 - 3	0.282
	6870.8		30.16	2 - 2	0.202
	6857.6		30.16	2 - 1	0.122
N III	4097.3	(1)	30.33	1/2-3/2	0.484
	4103.4		30.33	1/2-1/2	0.242
	4640.6	(2)	32.99	3/2-5/2	0.385
	4634.2		32.99	1/2-3/2	0.428
	4641.9		32.99	3/2-3/2	0.0427
	4514.9	(3)	38.25	5/2-7/2	0.286
	4510.9		38.24	3/2-5/2	0.225
	4510.9		38.23	1/2-3/2	0.179
	4534.6		38.24	5/2-5/2	0.0641
	4523.6		38.23	3/2-3/2	0.114
	4518.2		38.23	1/2-1/2	0.178

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J}$
N II	4547.3	(3)	38.23	5/2-3/2	0.00710
	4530.8		38.23	3/2-1/2	0.0178
	3771.1	(4)	38.79	5/2-3/2	0.0874
	3754.6		38.79	3/2-3/2	0.0877
	3745.8		38.79	1/2-3/2	0.0878
	3367.4	(5)	39.18	5/2-5/2	0.207
	3361.9		39.18	3/2-3/2	0.0395
	3358.7		39.17	1/2-1/2	0.0494
	3374.1		39.18	5/2-3/2	0.0887
	3365.8		39.17	3/2-1/2	0.123
	3354.3		39.18	3/2-5/2	0.134
	3353.8		39.18	1/2-3/2	0.247
	4200.0	(6)	39.64	3/2-5/2	0.398
	4195.7		39.62	1/2-3/2	0.442
	4215.7		39.62	3/2-3/2	0.0440
	3355.5	(7)	40.38	3/2-1/2	0.112
	3342.8		40.38	1/2-1/2	0.113
	3938.5	(8)	41.30	3/2-5/2	0.335
	3934.4		41.30	1/2-3/2	0.372
	3942.8		41.30	3/2-3/2	0.0372
	4867.2	(9)	40.79	7/2-9/2	0.279
	4861.3		40.78	5/2-7/2	0.255
	4858.9		40.77	3/2-5/2	0.250
	4858.7		40.77	1/2-3/2	0.312
	4884.1		40.78	7/2-7/2	0.0318
N III	4873.6		40.77	5/2-5/2	0.0542
	4867.2		40.77	3/2-3/2	0.0623
	4896.7		40.77	7/2-5/2	0.00158
	4881.8		40.77	5/2-3/2	0.00296
	4348.4	(10)	41.09	7/2-7/2	0.0561
	4335.5		41.09	5/2-5/2	0.0378
	4328.2		41.09	3/2-3/2	0.0263
	4323.9		41.08	1/2-1/2	0.0329
	4353.7		41.09	7/2-5/2	0.00934
	4339.5		41.09	5/2-3/2	0.0153
	4330.4		41.08	3/2-1/2	0.0164
	4330.1		41.09	5/2-7/2	0.0175
	4223.9		41.09	3/2-5/2	0.0236
	4321.4		41.09	1/2-3/2	0.0329
	3792.9	(11)	41.51	7/2-5/2	0.00533
	3771.5		41.51	5/2-3/2	0.00375
	3757.7		41.52	3/2-1/2	0.00224
	3779.2		41.51	5/2-5/2	0.00160
	3762.6		41.51	3/2-3/2	0.00287
	3752.7		41.52	1/2-1/2	0.00449
	3770.4		41.51	3/2-5/2	0.000268
	3757.6		41.51	1/2-3/2	0.000897
	4544.8	(12)	41.20	3/2-1/2	0.213
	4546.4	(13)	41.51	3/2-5/2	0.227

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J}$
N III	4535.1	(13)	41.51	3/2-3/2	0.304
	4527.9		41.52	3/2-1/2	0.152
	6466.9	(14)	41.09	5/2-7/2	0.361
	6454.0		41.09	3/2-5/2	0.285
	6445.1		41.09	1/2-3/2	0.226
	6478.7		41.09	5/2-5/2	0.0811
	6463.0		41.09	3/2-3/2	0.145
	6450.8		41.08	1/2-1/2	0.226
	6487.6		41.09	5/2-3/2	0.00900
	6468.8		41.08	3/2-1/2	0.0226
	5314.5	(15)	41.51	5/2-5/2	0.138
	5282.5		41.51	3/2-3/2	0.0265
	5260.9		41.52	1/2-1/2	0.0332
	5298.9		41.51	5/2-3/2	0.0594
	5272.6		41.52	3/2-1/2	0.0829
	5297.9		41.51	3/2-5/2	0.0890
	5270.6		41.51	1/2-3/2	0.166
	4003.6	(16)	42.31	5/2-7/2	0.677
	3998.7		42.31	3/2-5/2	0.709
N IV	3478.7	(1)	50.11	1 - 2	0.350
	3483.0		50.11	1 - 1	0.210
	3484.9		50.11	1 - 0	0.0699
	6383.0	(2)	49.94	0 - 1	0.359
	4057.8	(3)	52.98	1 - 2	0.321
	7123.1	(4)	51.85	2 - 3	0.136
	7109.5		51.85	1 - 2	0.121
	7103.3		51.85	0 - 1	0.162
	7127.2		51.85	2 - 2	0.0242
	7111.3		51.85	1 - 1	0.0404
	7129.0		51.85	2 - 1	0.00161
	5245.0	(5)	59.81	2 - 3	0.200
	5236.0		59.80	1 - 2	0.179
	5281.0		59.80	2 - 2	0.0355
	4528.0	(6)	60.19	2 - 1	0.0560
	4495.0		60.19	1 - 1	0.0564
	4479.0		60.19	0 - 1	0.0565
	3463.4	(7)	61.03	2 - 2	0.170
	3454.0		61.01	1 - 1	0.0567
	3474.6		61.01	2 - 1	0.0564
	3461.3		61.01	1 - 0	0.0754
	3443.0		61.03	1 - 2	0.0948
	3445.0		61.01	0 - 1	0.227
	3747.7	(8)	61.69	1 - 2	0.371
	5734.0	(9)	61.52	1 - 2	0.146
	4752.0	(11)	62.41	3 - 3	0.0345
	4733.0		62.41	2 - 2	0.0271
	4762.0		62.41	3 - 2	0.00431
	4740.0		62.40	2 - 1	0.00584
	4723.0		62.41	2 - 3	0.00608

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
N IV	3714.0	(12)	63.14	3 - 2	0.00359
	3689.0		63.14	2 - 1	0.00271
	3696.0		63.14	2 - 2	0.000901
	4183.0	(14)	63.14	1 - 2	0.177
	4174.0		63.14	1 - 1	0.107
	5846.0	(15)	63.14	2 - 2	0.0430
	5794.0		63.14	1 - 1	0.0145
	5828.0		63.14	2 - 1	0.0144
	5812.0		63.14	1 - 2	0.0240
	5073.0	(17)	64.12	2 - 1	0.00295
N V	4603.2	(1)	58.99	1/2-3/2	0.263
	4619.4		58.98	1/2-1/2	0.131
	3161.0	(2)	87.64	1/2-1/2	0.153
	3161.0		87.64	3/2-1/2	0.153
	4335.0	(3)	90.49	1/2-1/2	0.106
	4335.0		90.49	1/2-3/2	0.212
	5273.0	(4)	90.30	1/2-1/2	0.196
	5273.0		90.30	3/2-1/2	0.196
	4751.0	(5)	90.55	1/2-3/2	0.543
	5067.0	(6)	90.49	3/2-1/2	0.0813
	4933.0	(7)	90.56	3/2-5/2	0.828
	4952.0	(8)	90.55	5/2-3/2	0.0395
	6719.0	(11)	92.13	1/2-1/2	0.116
	6719.0		92.13	1/2-3/2	0.232
	7330.0	(12)	92.17	1/2-3/2	0.610
O I	7772.0	(1)	10.69	2 - 3	0.432
	7774.2		10.69	2 - 2	0.309
	7775.4		10.69	2 - 1	0.185
	3947.3	(3)	12.23	2 - 3	0.00177
	3947.5		12.23	2 - 2	0.00126
	3947.6		12.23	2 - 1	0.000751
	8446.4	(4)	10.94	1 - 2	0.553
	8446.8		10.94	1 - 1	0.332
	8446.4		10.94	1 - 0	0.111
	4368.3	(5)	12.31	1 - 2	0.00413
	4368.3		12.31	1 - 1	0.00248
	4368.3		12.31	1 - 0	0.000826
	3692.4	(6)	12.82	1 - 2	0.000305
	3692.4		12.82	1 - 1	0.000183
	3692.4		12.82	1 - 0	0.000061
	11302.2	(7)	11.79	3 - 2	0.152
	11297.5		11.79	2 - 2	0.152
	11295.0		11.79	1 - 2	0.152
	9266.0	(8)	12.03	3 - 4	0.685
	9266.0		12.03	3 - 3	0.178
	9266.0		12.03	3 - 2	0.0254
	9262.7		12.03	2 - 3	0.497
	9262.7		12.03	2 - 2	0.311
O I	9262.7	(8)	12.03	2 - 1	0.0799
	9260.9		12.03	1 - 2	0.311
	9260.9		12.03	1 - 1	0.399
	9260.9		12.03	1 - 0	0.177
	6456.0	(9)	12.61	3 - 2	0.0155
	6454.5		12.61	2 - 2	0.0155
	6453.6		12.61	1 - 2	0.0155
	6158.2	(10)	12.70	3 - 4	0.0535
	6158.2		12.70	3 - 3	0.0139
	6158.2		12.70	3 - 2	0.00198
	6156.8		12.70	2 - 3	0.0389
	6156.8		12.70	2 - 2	0.0243
	6156.8		12.70	2 - 1	0.00625
	6156.0		12.70	1 - 2	0.0243
	6156.0		12.70	1 - 1	0.0313
	6156.0		12.70	1 - 0	0.0139
	5436.8	(11)	12.96	3 - 2	0.00515
	5435.8		12.96	2 - 2	0.00515
	5435.2		12.96	1 - 2	0.00515
	5330.7	(12)	13.01	3 - 4	0.0143
	5330.7		13.01	3 - 3	0.00370
	5330.7		13.01	3 - 2	0.000528
	5329.6		13.01	2 - 3	0.0104
	5329.6		13.01	2 - 2	0.00648
	5329.6		13.01	2 - 1	0.00167
	5329.0		13.01	1 - 2	0.00649
	5329.0		13.01	1 - 1	0.00834
	5329.0		13.01	1 - 0	0.00371
	5020.1	(13)	13.15	3 - 2	0.00241
	5019.3		13.15	2 - 2	0.00242
	5018.8		13.15	1 - 2	0.00242
	7254.5	(20)	12.64	2 - 1	0.0160
	7254.2		12.64	1 - 1	0.0160
	7254.5		12.64	0 - 1	0.0160
	7002.2	(21)	12.70	2 - 3	0.0340
	7002.2		12.70	2 - 2	0.00606
	7002.2		12.70	2 - 1	0.000404
	7001.9		12.70	1 - 2	0.0303
	7001.9		12.70	1 - 1	0.0101
	7002.2		12.70	0 - 1	0.0404
	6046.5	(22)	12.98	2 - 1	0.00523
	6046.3		12.98	1 - 1	0.00523
	6046.5		12.98	0 - 1	0.00523
	5958.6	(23)	13.01	2 - 3	0.00633
	5958.6		13.01	2 - 2	0.00113
	5958.6		13.01	2 - 1	0.000075
	5958.5		13.01	1 - 2	0.00566
	5958.5		13.01	1 - 1	0.00189
	5958.6		13.01	0 - 1	0.00754
O I	8221.8	(34)	13.99	3 - 3	0.268
	8230.0		13.99	2 - 2	0.209
	8233.0		13.99	1 - 1	0.226
	8221.8		13.99	3 - 2	0.0335
	8227.6		13.99	2 - 1	0.0452
	8230.0		13.99	2 - 3	0.0468
	8235.3		13.99	1 - 2	0.0752
	7947.6	(35)	14.04	3 - 4	0.399
	7950.8		14.04	2 - 3	0.387
	7952.2		14.04	1 - 2	0.435
	7943.2		14.04	3 - 3	0.0345
	7947.2		14.04	2 - 2	0.0483
	7939.5		14.04	3 - 2	0.000986
	8820.5	(37)	14.07	2 - 3	0.427
	7156.8	(38)	14.40	2 - 2	0.351
	9156.0	(41)	15.33	3 - 4	0.454
	6106.3	(43)	16.01	3 - 4	0.0359
	5995.3	(44)	16.04	3 - 2	0.00927
	5991.9		16.05	2 - 1	0.00702
	5991.3		16.05	1 - 0	0.00523
	5995.3		16.04	2 - 2	0.00232
	5993.2		16.05	1 - 1	0.00390
	9522.0	(45)	15.33	4 - 4	0.168
	9487.5	(47)	15.34	3 - 4	0.647
	9498.0		15.34	2 - 3	0.691
	6266.9	(48)	16.01	4 - 4	0.0116
	6256.8	(50)	16.01	3 - 4	0.0480
	6261.6		16.01	2 - 3	0.0505
	5410.8	(51)	16.32	4 - 4	0.00284
	5404.9	(53)	16.32	3 - 4	0.0129
	7476.5	(55)	15.71	2 - 3	0.440
	7479.1		15.71	1 - 2	0.393
	7480.7		15.71	0 - 1	0.524
	7473.2		15.71	2 - 2	0.0787
	7477.2		15.71	1 - 1	0.131
	7471.4		15.71	2 - 1	0.00524
	9760.7	(56)	15.34	3 - 4	0.696
	9677.4	(58)	15.35	3 - 3	0.181
	6374.3	(59)	16.01	3 - 4	0.0452
	6351.2	(61)	16.02	3 - 3	0.0133
	5492.8	(62)	16.32	3 - 4	0.0107
	7886.3	(64)	15.88	1 - 2	0.549
	6653.8	(65)	16.16	1 - 0	0.117
O II	4649.1	(1)	25.55	5/2-7/2	0.353
	4641.8		25.54	3/2-5/2	0.278
	4638.9		25.53	1/2-3/2	0.220
	4676.2		25.54	5/2-5/2	0.0789
	4661.6		25.53	3/2-3/2	0.140
	4650.8		25.52	1/2-1/2	0.219

Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J'J}$
O II	4696.4 (1)	25.53	5/2-3/2	0.00872
	4673.8	25.52	3/2-1/2	0.0219
	4349.4 (2)	25.74	5/2-5/2	0.200
	4336.9	25.73	3/2-3/2	0.0381
	4325.8	25.72	1/2-1/2	0.0477
	4366.9	25.73	5/2-3/2	0.0854
	4345.6	25.72	3/2-1/2	0.119
	4319.6	25.74	3/2-5/2	0.129
	4317.1	25.73	1/2-3/2	0.239
	3749.5 (3)	26.19	5/2-3/2	0.111
	3727.3	26.19	3/2-3/2	0.111
	3712.8	26.19	1/2-3/2	0.111
	6721.4 (4)	25.18	3/2-1/2	0.0625
	6640.9	25.18	1/2-1/2	0.0632
	4414.9 (5)	26.14	3/2-5/2	0.455
	4417.0	26.11	1/2-3/2	0.503
	4452.4	26.11	3/2-3/2	0.0501
	3973.3 (6)	26.45	3/2-3/2	0.281
	3954.4	26.44	1/2-1/2	0.225
	3982.7	26.44	3/2-1/2	0.0560
	3945.0	26.45	1/2-3/2	0.113
	3390.3 (9)	28.82	1/2-3/2	0.605
	3377.2	28.83	1/2-1/2	0.304
	4075.9 (10)	28.58	7/2-9/2	0.605
	4072.2	28.57	5/2-7/2	0.552
	4069.9	28.56	3/2-5/2	0.539
	4069.6	28.55	1/2-3/2	0.673
	4092.9	28.57	7/2-7/2	0.0688
	4085.1	28.56	5/2-5/2	0.117
	4078.9	28.55	3/2-3/2	0.134
	4106.0	28.56	7/2-5/2	0.00343
	4094.2	28.55	5/2-3/2	0.00638
	3926.6 (11)	28.70	7/2-5/2	0.00845
	3896.3	28.71	5/2-3/2	0.00595
	3872.5	28.71	3/2-1/2	0.00356
	3907.5	28.70	5/2-5/2	0.00254
	3882.5	28.71	3/2-3/2	0.00454
	3864.1	28.71	1/2-1/2	0.00712
	3893.5	28.70	3/2-5/2	0.000424
	3874.1	28.71	1/2-3/2	0.00142
	3882.2 (12)	28.73	7/2-7/2	0.110
	3864.5	28.73	5/2-5/2	0.0742
	3851.0	28.73	3/2-3/2	0.0515
	3847.9	28.73	1/2-1/2	0.0644
	3883.2	28.73	7/2-5/2	0.0184
	3864.7	28.73	5/2-3/2	0.0300
	3856.2	28.73	3/2-1/2	0.0322
	3863.5	28.73	5/2-7/2	0.0245
	3850.8	28.73	3/2-5/2	0.0451

Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J'J}$
O II	3842.8 (12)	28.73	1/2-3/2	0.0645
	3134.8 (14)	29.49	7/2-5/2	0.115
	3130.4	29.47	5/2-3/2	0.0812
	3129.8	29.46	3/2-1/2	0.0487
	3122.6	29.49	5/2-5/2	0.0340
	3129.4	29.47	3/2-3/2	0.0615
	3134.3	29.46	1/2-1/2	0.0971
	3113.7	29.49	3/2-5/2	0.00563
	3124.0	29.47	1/2-3/2	0.0191
	4591.0 (15)	28.24	5/2-7/2	0.368
	4596.2	28.24	3/2-5/2	0.386
	4351.3 (16)	28.39	5/2-5/2	0.273
	4347.4	28.39	3/2-3/2	0.264
	3912.0 (17)	28.71	5/2-3/2	0.196
	3919.3	28.70	3/2-1/2	0.163
	3912.1	28.71	3/2-3/2	0.0326
	4169.2 (19)	28.70	5/2-5/2	0.145
	4140.7	28.71	3/2-3/2	0.0277
	4121.5	28.71	1/2-1/2	0.0348
	4156.5	28.71	5/2-3/2	0.0623
	4129.3	28.71	3/2-1/2	0.0869
	4150.3	28.70	3/2-5/2	0.0932
	4132.8	28.71	1/2-3/2	0.173
	4119.2 (20)	28.73	5/2-7/2	0.504
	4104.7	28.73	3/2-5/2	0.397
	4097.3	28.73	1/2-3/2	0.315
	4120.3	28.73	5/2-5/2	0.113
	4105.0	28.73	3/2-3/2	0.202
	4103.0	28.73	1/2-1/2	0.315
	4120.6	28.73	5/2-3/2	0.0126
	4110.8	28.73	3/2-1/2	0.0315
	3287.6 (23)	29.49	5/2-5/2	0.0893
	3295.1	29.47	3/2-3/2	0.0173
	3301.6	29.46	1/2-1/2	0.0218
	3305.2	29.47	5/2-3/2	0.0387
	3306.6	29.46	3/2-1/2	0.0547
	3277.7	29.49	3/2-5/2	0.0570
	3290.1	29.47	1/2-3/2	0.108
	4705.4 (25)	28.76	5/2-7/2	0.638
	4699.2	28.74	3/2-5/2	0.666
	4741.7	28.74	5/2-5/2	0.0315
	4396.0 (26)	28.94	5/2-5/2	0.122
	4369.3	28.94	3/2-3/2	0.118
	4406.0	28.94	5/2-3/2	0.00869
	4359.1	28.94	3/2-5/2	0.0131
	3470.8 (27)	29.69	5/2-3/2	0.130
	3470.4	29.67	3/2-1/2	0.110
	3448.0	29.69	3/2-3/2	0.0214
	4924.6 (28)	28.70	3/2-5/2	0.381

Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J'J}$
C II	4906.9 (28)	28.71	3/2-3/2	0.255
	4890.9	28.71	3/2-1/2	0.128
	3739.9 (31)	29.49	3/2-5/2	0.0812
	3762.6	29.47	3/2-3/2	0.0550
	3777.6	29.46	3/2-1/2	0.0278
	5206.7 (32)	28.82	3/2-3/2	0.160
	5160.0	28.83	1/2-1/2	0.130
	5176.0	28.83	3/2-1/2	0.0323
	5190.6	28.82	1/2-3/2	0.0643
	4943.1 (33)	28.94	3/2-5/2	0.558
	4941.1	28.94	1/2-3/2	0.618
	4955.8	28.94	3/2-3/2	0.0617
	3803.1 (34)	29.69	3/2-3/2	0.130
	3821.7	29.67	1/2-1/2	0.106
	3830.5	29.67	3/2-1/2	0.0266
	3794.5	29.69	1/2-3/2	0.0519
	4448.2 (35)	31.01	7/2-7/2	0.146
	4443.1	31.01	5/2-5/2	0.144
	4189.8 (36)	31.18	7/2-9/2	0.617
	4185.5	31.18	5/2-7/2	0.654
	4113.8 (37)	31.24	7/2-5/2	0.0240
	4110.2	31.24	5/2-3/2	0.0224
	3273.5 (39)	32.01	7/2-5/2	0.126
	3271.0	32.01	5/2-3/2	0.117
	4699.2 (40)	31.01	5/2-7/2	0.392
	4703.2	31.01	3/2-5/2	0.411
	4698.5	31.01	5/2-5/2	0.0196
	4327.5 (41)	31.24	5/2-5/2	0.269
	4331.9	31.24	3/2-3/2	0.260
	4327.9	31.24	5/2-3/2	0.0193
	4331.5	31.24	3/2-5/2	0.0289
	4192.5 (42)	31.33	5/2-3/2	0.0772
	4196.7	31.33	3/2-1/2	0.0643
	4196.3	31.33	3/2-3/2	0.0129
	3407.4 (44)	32.01	5/2-5/2	0.128
	3407.4	32.01	5/2-3/2	0.00911
	3409.8	32.01	3/2-5/2	0.0137
	3409.8	32.01	3/2-3/2	0.123
	6895.3 (45)	30.37	9/2-7/2	0.147
	6906.5	30.36	7/2-5/2	0.127
	6910.8	30.35	5/2-3/2	0.110
	6908.1	30.34	3/2-1/2	0.103
	6847.0	30.37	7/2-7/2	0.0209
	6869.7	30.36	5/2-5/2	0.0358
	6885.1	30.35	3/2-3/2	0.0412
	4107.1 (47)	31.57	5/2-7/2	0.000019
	4097.3 (48)	31.58	7/2-9/2	0.738
	4095.6	31.57	5/2-7/2	0.740
	4087.2	31.57	3/2-5/2	0.827

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
O II	4108.8	(48)	31.57	7/2-7/2	0.0880
	4096.2		31.57	5/2-5/2	0.0888
	4062.9	(50)	31.62	9/2-9/2	0.0646
	4048.2		61.62	7/2-7/2	0.0535
	4041.3		31.61	5/2-5/2	0.0483
	4033.2		31.61	3/2-3/2	0.0560
	4054.1		31.61	7/2-5/2	0.00944
	4046.2		31.62	7/2-9/2	0.00726
	3371.9	(52)	32.24	9/2-7/2	0.0111
	3375.8		32.23	7/2-5/2	0.00940
	3360.2		32.24	7/2-7/2	0.00159
	3367.0		32.23	5/2-5/2	0.00267
	3370.2		32.22	3/2-3/2	0.00304
	4303.8	(54)	31.57	5/2-7/2	0.757
	4294.8		31.58	3/2-5/2	0.595
	4281.4		31.58	5/2-5/2	0.170
	4282.8		31.59	3/2-3/2	0.300
	4288.8		31.59	1/2-1/2	0.471
	4276.7		31.59	3/2-1/2	0.0470
	3013.4	(56)	32.79	5/2-7/2	0.129
	4871.6	(57)	31.24	3/2-5/2	0.245
	4861.0		31.24	1/2-3/2	0.272
	4701.2	(58)	31.33	3/2-3/2	0.306
	4691.5		31.33	1/2-1/2	0.245
	4701.8		31.33	3/2-1/2	0.0612
	4691.0		31.33	1/2-3/2	0.123
	4328.6	(61)	31.56	3/2-1/2	0.180
	4319.9		31.56	1/2-1/2	0.180
	3735.9	(62)	32.01	3/2-5/2	0.145
	3729.3		32.01	1/2-3/2	0.161
	4358.4	(64)	31.57	7/2-7/2	0.0912
	4334.3		31.58	5/2-5/2	0.0610
	4309.0		31.59	1/2-1/2	0.0526
	4315.4		31.59	3/2-1/2	0.0263
	4357.3		31.57	5/2-7/2	0.0203
	4315.4		31.59	1/2-3/2	0.0525
	4275.5	(67)	31.62	7/2-9/2	0.744
	4276.7		31.62	5/2-7/2	0.681
	4283.0		31.61	3/2-5/2	0.669
	4277.4		31.61	1/2-3/2	0.835
	4277.9		31.62	7/2-7/2	0.0852
	4283.1		31.61	5/2-5/2	0.146
	4283.8		31.61	3/2-3/2	0.167
	3516.9	(69)	32.24	7/2-7/2	0.00253
	3534.0		32.23	7/2-5/2	0.000370
	3495.4	(70)	32.26	7/2-5/2	0.00852
	3506.0		32.25	5/2-3/2	0.00588
	3494.7		32.26	5/2-5/2	0.00256
	3501.7		32.25	1/2-3/2	0.00140

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
O II	3035.8	(72)	32.79	7/2-7/2	0.0152
	3039.5		32.79	5/2-7/2	0.00337
	3007.1	(74)	32.84	7/2-9/2	0.137
	3007.7		32.84	5/2-7/2	0.125
	3008.3		32.84	7/2-7/2	0.0156
	4342.0	(77)	31.60	7/2-9/2	0.851
	4340.4		31.58	5/2-7/2	0.876
	4312.1	(79)	31.62	7/2-7/2	0.0723
	4315.4		31.62	7/2-5/2	0.00268
	3458.0	(81)	32.33	7/2-5/2	0.120
	3459.1		32.31	5/2-3/2	0.0110
	3032.1	(83)	32.83	7/2-9/2	0.150
	3032.5		32.81	5/2-7/2	0.150
	6627.6	(85)	30.68	3/2-3/2	0.0470
	6678.2		30.68	1/2-3/2	0.0190
	6666.9		30.67	3/2-1/2	0.00950
	4491.3	(86)	31.56	3/2-5/2	0.883
	4489.5		31.58	1/2-3/2	0.982
	4707.8	(89)	31.56	5/2-5/2	0.105
	4669.5		31.58	3/2-3/2	0.101
	4609.4	(93)	31.62	5/2-7/2	0.849
	4602.1		31.62	3/2-5/2	0.891
	4613.1		31.62	5/2-5/2	0.0425
	4465.4	(94)	33.06	5/2-7/2	0.367
	4467.9		33.06	5/2-5/2	0.275
	4469.3		33.06	5/2-3/2	0.183
	4060.6	(97)	34.05	7/2-9/2	0.667
	4061.0		34.05	5/2-7/2	0.686
	4054.1	(98)	34.06	7/2-7/2	0.185
	4054.6		34.06	5/2-5/2	0.183
	4024.0	(99)	34.08	5/2-3/2	0.0169
	4302.8	(100)	34.05	9/2-9/2	0.110
	4303.1		34.05	7/2-7/2	0.110
	4378.4	(102)	34.06	5/2-7/2	0.628
	4378.0		34.06	3/2-5/2	0.659
	4343.4	(103)	34.08	5/2-5/2	0.254
	4342.8		34.08	3/2-5/2	0.245
	4488.1	(104)	34.08	3/2-5/2	0.589
	4487.7		34.08	1/2-3/2	0.654
	4843.3	(105)	34.10	1/2-3/2	0.694
	4843.3		34.10	1/2-1/2	0.350
	4146.1	(106)	36.03	7/2-9/2	0.602
	4143.8		36.03	5/2-7/2	0.413
	4142.2		36.03	3/2-5/2	0.225
	4145.9		36.03	7/2-7/2	0.172
	4143.5		36.03	5/2-5/2	0.294
	4142.0		36.03	3/2-3/2	0.338
	4142.1		36.04	3/2-1/2	0.241
	3218.1	(107)	36.89	7/2-5/2	0.124

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
O II	3216.8	(107)	36.89	5/2-5/2	0.124
	3216.1		36.89	3/2-5/2	0.124
O III	3759.9	(2)	36.32	2 - 3	0.311
	3754.7		36.29	1 - 2	0.277
	3757.2		36.28	0 - 1	0.369
	3791.3		36.29	2 - 2	0.0550
	3774.0		36.28	1 - 1	0.0918
	3811.0		36.28	2 - 1	0.00364
	3340.7	(3)	36.73	2 - 1	0.0842
	3312.3		36.73	1 - 1	0.0847
	3299.4		36.73	0 - 1	0.0850
	3047.1	(4)	37.09	2 - 2	0.210
	3035.4		37.07	1 - 1	0.0700
	3059.3		37.07	2 - 1	0.0696
	3043.0		37.06	1 - 0	0.0930
	3023.5		37.09	1 - 2	0.117
	3024.6		37.07	0 - 1	0.281
	5592.4	(5)	35.92	1 - 1	0.151
	2983.8	(6)	37.85	1 - 2	0.509
	3265.5	(8)	40.10	3 - 4	0.418
	3261.0		40.08	2 - 3	0.403
	3267.3		40.05	1 - 2	0.451
	3284.6		40.08	3 - 3	0.0358
	3281.9		40.05	2 - 2	0.0499
	3305.8		40.05	3 - 2	0.00101
	3017.6	(10)	40.41	3 - 3	0.0809
	3004.4		40.40	2 - 2	0.0633
	2996.5		40.40	1 - 1	0.0684
	3024.4		40.40	3 - 2	0.0101
	3008.8		40.40	2 - 1	0.0136
	2997.7		40.41	2 - 3	0.0142
	2992.1		40.40	1 - 2	0.0229
	3132.9	(12)	40.67	1 - 2	0.343
	3121.7		40.69	1 - 1	0.207
	3115.7		40.69	1 - 0	0.0691
	3715.1	(14)	40.41	2 - 3	0.325
	3707.2		40.40	1 - 2	0.290
	3702.8		40.40	0 - 1	0.386
	3725.3		40.40	2 - 2	0.0577
	3714.0		40.40	1 - 1	0.0964
	3732.1		40.40	2 - 1	0.00384
	3444.1	(15)	40.67	2 - 2	0.108
	3415.3		40.69	1 - 1	0.0362
	3430.6		40.69	2 - 1	0.0361
	3408.1		40.69	1 - 0	0.0485
	3428.7		40.67	1 - 2	0.0601
	3405.7		40.69	0 - 1	0.145
	5508.1	(16)	40.09	2 - 2	0.0510
	3961.6	(17)	40.96	2 - 3	0.454

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
O III	3816.8	(18)	41.08	2 - 1	0.00571
	5268.1	(19)	41.08	0 - 1	0.429
	3034.3	(20)	45.15	1 - 1	0.0582
	3703.4	(21)	45.11	3 - 4	0.290
	3698.7		45.10	2 - 3	0.210
	3695.4		45.08	1 - 2	0.131
	3720.9		45.10	3 - 3	0.0748
	3712.5		45.08	2 - 2	0.131
	3704.7		45.08	1 - 1	0.168
	3734.8		45.08	3 - 2	0.0106
	3722.0		45.08	2 - 1	0.0336
	3709.5		45.07	1 - 0	0.0747
	3351.0	(22)	45.46	3 - 3	0.168
	3344.3		45.45	2 - 2	0.0210
	3336.8		45.44	1 - 1	0.0630
	3362.4		45.45	3 - 2	0.0835
	3350.7		45.44	2 - 1	0.113
	3333.0		45.46	2 - 3	0.118
	3330.4		45.46	1 - 2	0.189
	4081.1	(23)	46.27	2 - 3	0.328
	4073.9		46.25	1 - 2	0.293
	3556.9	(24)	46.71	2 - 2	0.204
	3450.9	(25)	48.67	3 - 4	0.322
	3448.1		48.66	2 - 3	0.289
	3446.7		48.66	1 - 2	0.280
	3447.2		48.65	0 - 1	0.420
	3466.2		48.67	4 - 4	0.0500
	3460.0		48.66	3 - 3	0.0899
	3454.9		48.66	2 - 2	0.120
	3451.3		48.65	1 - 1	0.140
	3466.9		48.66	3 - 2	0.00854
	3459.5		48.65	2 - 1	0.0120
	3088.0	(26)	49.11	4 - 4	0.0738
	3083.7		49.10	3 - 3	0.0443
	3075.2		49.10	2 - 2	0.0222
	3095.8		49.10	4 - 3	0.0147
	3084.6		49.10	3 - 2	0.0253
	3074.7		49.10	2 - 1	0.0310
	3068.1		49.10	1 - 0	0.0296
	3076.0		49.11	3 - 4	0.0190
	3074.2		49.10	2 - 3	0.0355
	3068.7		49.10	1 - 2	0.0518
	3065.0		49.10	0 - 1	0.0889
	3385.0	(27)	49.11	3 - 4	0.319
	3382.7		49.10	2 - 3	0.231
	3394.3		49.10	3 - 3	0.0823
	3383.9		49.10	2 - 2	0.144
	3376.8		49.10	1 - 1	0.186
	3355.9	(28)	49.14	3 - 3	0.0929

	Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J'J}$
O III	3336.8	(28)	49.15	2 - 2	0.0117
	3326.2		49.15	1 - 1	0.0352
	3348.1		49.15	3 - 2	0.0466
	3332.5		49.15	2 - 1	0.0632
	3344.3		49.14	2 - 3	0.0652
	3330.4		49.15	1 - 2	0.105
	3280.0	(29)	49.82	0 - 1	0.115
	3728.8	(30)	49.58	3 - 4	0.424
	3728.5		49.56	2 - 3	0.410
	3729.7		49.55	1 - 2	0.460
	3216.0	(31)	50.11	3 - 3	0.0900
	3207.1		50.10	2 - 2	0.0704
	3201.0		50.10	1 - 1	0.0762
	4461.6	(33)	49.14	2 - 3	0.203
	4447.8		49.15	2 - 2	0.146
	4440.1		49.15	2 - 1	0.0878
	4555.3	(34)	49.42	2 - 2	0.0839
	3638.7	(35)	50.11	2 - 3	0.388
	3646.8		50.10	1 - 2	0.345
	3653.0		50.10	0 - 1	0.460
	3645.2		50.10	2 - 2	0.0691
	3650.7		50.10	1 - 1	0.115
	3649.2		50.10	2 - 1	0.00460
O IV	3063.5	(1)	48.18	1/2-3/2	0.412
	3071.7		48.17	1/2-1/2	0.205
	3411.8	(2)	51.79	3/2-5/2	0.301
	3403.6		51.79	1/2-3/2	0.336
	3413.7		51.79	3/2-3/2	0.0335
	3385.6	(3)	57.84	5/2-7/2	0.243
	3381.3		57.81	3/2-5/2	0.191
	3381.3		57.79	1/2-3/2	0.152
	3409.8		57.81	5/2-5/2	0.0543
	3396.8		57.79	3/2-3/2	0.0967
	3390.4		57.78	1/2-1/2	0.151
	3425.6		57.79	5/2-3/2	0.00600
	3406.0		57.78	3/2-1/2	0.0151
	3349.1	(4)	59.62	5/2-5/2	0.312
	3348.1		59.59	1/2-3/2	0.346
	3378.1		59.59	3/2-3/2	0.0344
	3052.5	(5)	59.97	3/2-1/2	0.0784
	3028.0		59.97	1/2-1/2	0.0788
	3736.8	(6)	61.14	7/2-9/2	0.210
	3729.0		61.12	5/2-7/2	0.192
	3725.8		61.11	3/2-5/2	0.188
	3725.8		61.10	1/2-3/2	0.235
	3758.5		61.12	7/2-7/2	0.0238
	3744.7		61.11	5/2-5/2	0.0407
	3736.8		61.10	3/2-3/2	0.0468
	4774.4		61.11	7/2-5/2	0.00118

	Wavelength [Å][4]		E^{2}	J-J'[3]	$f_{J'J}$
O IV	3755.8	(6)	61.10	5/2-3/2	0.00222
	3209.6	(7)	61.68	7/2-7/2	0.0444
	3194.8		61.67	5/2-5/2	0.0299
	3185.7		61.67	3/2-3/2	0.0208
	3180.7		61.66	1/2-1/2	0.0261
	3216.3		61.67	7/2-5/2	0.00737
	3199.5		61.67	5/2-3/2	0.0121
	3188.7		61.66	3/2-1/2	0.0130
	3188.2		61.68	5/2-7/2	0.00993
	3181.0		61.67	3/2-5/2	0.0183
	3177.8		61.67	1/2-3/2	0.0261
	3375.5	(8)	62.20	3/2-5/2	0.174
	3362.6		62.21	3/2-3/2	0.117
	3354.3		62.22	3/2-1/2	0.0585
	4798.3	(9)	61.68	5/2-7/2	0.139
	4783.4		61.67	3/2-5/2	0.110
	4772.6		61.67	1/2-3/2	0.0874
	4813.1		61.67	5/2-5/2	0.0222
	4794.2		61.67	3/2-3/2	0.0557
	4779.1		61.66	1/2-1/2	0.0873
	4823.9		61.67	5/2-3/2	0.00346
	4800.8		61.66	3/2-1/2	0.00869
	3995.2	(10)	62.20	5/2-5/2	0.0516
	3956.8		62.21	3/2-3/2	0.00994
	3930.6		62.22	1/2-1/2	0.0125
	3977.1		62.21	5/2-3/2	0.0223
	3945.3		62.22	3/2-1/2	0.0312
	3974.7		62.20	3/2-5/2	0.0333
	3942.1		62.21	1/2-3/2	0.0624
	5362.4	(11)	61.92	5/2-5/2	0.0299
	5305.3		61.91	3/2-3/2	0.0291
	3563.4	(12)	63.08	5/2-7/2	0.292
	3560.4		63.05	3/2-5/2	0.306
	3520.9	(13)	63.48	1/2-3/2	0.259
	3502.2		63.50	1/2-1/2	0.130
	3489.8	(14)	67.57	3/2-5/2	0.271
	3492.2		67.57	1/2-3/2	0.301
	4568.0	(15)	70.91	7/2-5/2	0.0278
	4568.0		70.91	5/2-5/2	0.00185
	4568.0		70.91	5/2-3/2	0.0259
O V	5114.0	(1)	71.70	0 - 1	0.301
	3144.7	(2)	75.63	1 - 2	0.265
	5600.0	(3)	74.13	2 - 3	0.112
	5582.0		74.12	1 - 2	0.101
	5573.0		74.12	0 - 1	0.134
	5606.0		74.12	2 - 2	0.000135
	5584.0		74.12	1 - 1	0.0335
	5608.0		74.12	2 - 1	0.00133
	4123.9	(4)	83.62	2 - 3	0.173

	Wavelength [Å][1]		E^2	J-J'[3]	$f_{J,J}$
O V	4120.0	(4)	83.58	1 - 2	0.155
	4123.0		83.56	0 - 1	0.206
	4179.0		83.58	2 - 2	0.0305
	4151.0		83.56	1 - 1	0.0511
	4211.0		83.56	2 - 1	0.00202
	3275.7	(5)	84.39	2 - 1	0.0530
	3235.0		84.39	1 - 1	0.0535
	3222.0		84.39	0 - 1	0.0538
	3058.7	(6)	86.07	1 - 2	0.305
	4554.3	(7)	85.75	1 - 2	0.121
	3747.0	(8)	86.91	3 - 3	0.0285
	3717.0		86.90	2 - 2	0.0224
	3701.0		86.89	1 - 1	0.0243
	3762.0		86.90	3 - 2	0.00354
	3726.0		86.89	2 - 1	0.00483
	3703.0		86.91	2 - 3	0.00504
	3692.0		86.90	1 - 2	0.00812
	3298.0	(9)	87.36	3 - 2	0.00250
	3249.0		87.38	2 - 1	0.00191
	3222.0		87.39	1 - 0	0.00143
	3264.0		87.36	2 - 2	0.000632
	3230.0		87.38	1 - 1	0.00107
	3245.0		87.36	1 - 2	0.000071
	4158.8	(11)	87.46	1 - 2	0.111
	4135.9		87.38	1 - 1	0.0668
	4121.7		87.39	1 - 0	0.0224
	6830.0	(12)	86.91	2 - 3	0.0732
	6790.0		86.90	1 - 2	0.0657
	6767.0		86.89	0 - 1	0.0879
	6878.0		86.90	2 - 2	0.0130
	6819.0		86.89	1 - 1	0.0218
	6909.0		86.89	2 - 1	0.000860
	5473.0	(13)	87.36	2 - 2	0.0283
	5376.0		87.38	1 - 1	0.00961
	5432.0		87.38	2 - 1	0.00951
	5352.0		87.39	1 - 0	0.0129
	5417.0		87.36	1 - 2	0.0159
	5343.0		87.38	0 - 1	0.0387
	6529.0	(14)	88.02	2 - 3	0.114
	4522.0	(15)	88.79	2 - 1	0.00203
	7438.0	(17)	90.81	1 - 2	0.406
	7438.0		90.81	1 - 1	0.243
	7438.0		90.81	1 - 0	0.0811
O VI	3811.4	(1)	82.25	1/2-3/2	0.223
	3824.2		82.23	1/2-1/2	0.111
	3068.0	(2)	127.49	1/2-3/2	0.247
	3068.0		127.49	1/2-1/2	0.123
	3622.0	(3)	127.25	1/2-1/2	0.178
	3314.0	(4)	127.57	1/2-3/2	0.554

	Wavelength [Å][4]		E^2	J-J'[3]	$f_{J,J}$
C VI	3509.0	(5)	127.49	3/2-1/2	0.0791
	3426.0	(6)	127.57	3/2-5/2	0.824
	3438.0	(7)	127.57	5/2-3/2	0.0398
	4751.0	(10)	129.85	1/2-1/2	0.143
	4751.0		129.85	1/2-3/2	0.286
	5602.0	(11)	129.69	1/2-1/2	0.216
	5602.0		129.69	3/2-1/2	0.216
	5112.0	(12)	129.90	1/2-3/2	0.603
	5420.0	(13)	129.85	3/2-1/2	0.108
	5279.0	(14)	129.90	3/2-5/2	0.960
Ne II	3694.2	(1)	30.39	5/2-5/2	0.180
	3734.9		30.42	3/2-3/2	0.0342
	3751.3		30.44	1/2-1/2	0.0428
	3664.1		30.42	5/2-3/2	0.0779
	3709.6		30.44	3/2-1/2	0.108
	3766.3		30.39	3/2-5/2	0.114
	3777.2		30.42	1/2-3/2	0.212
	3334.9	(2)	30.75	5/2-7/2	0.384
	3355.1		30.79	3/2-5/2	0.303
	3360.6		30.83	1/2-3/2	0.242
	3297.7		30.79	5/2-5/2	0.0874
	3327.2		30.83	3/2-3/2	0.155
	3344.4		30.84	1/2-1/2	0.243
	3270.8		30.83	5/2-3/2	0.00980
	3311.3		30.84	3/2-1/2	0.0274
	3001.7	(4)	31.23	3/2-3/2	0.108
	3028.8		31.23	1/2-3/2	0.108
	3719.1	(5)	30.99	3/2-5/2	0.422
	3727.1		31.05	1/2-3/2	0.473
	3743.9		31.05	3/2-3/2	0.0479
	3482.0	(6)	31.21	3/2-1/2	0.100
	3557.8		31.21	1/2-1/2	0.0993
	3323.8	(7)	31.38	3/2-3/2	0.263
	3378.3		31.39	1/2-1/2	0.210
	3309.8		31.39	3/2-1/2	0.0529
	3392.8		31.38	1/2-3/2	0.104
	3034.5	(8)	34.46	5/2-7/2	0.522
	3047.6		34.47	3/2-5/2	0.412
	3054.7		34.48	1/2-3/2	0.328
	3027.0		34.47	5/2-5/2	0.118
	3037.7		34.48	3/2-5/2	0.210
	3045.6		34.50	1/2-1/2	0.329
	3017.3		34.48	5/2-3/2	0.0131
	3568.5	(9)	33.88	5/2-7/2	0.367
	3574.6		33.87	3/2-5/2	0.384
	3574.2		33.87	5/2-5/2	0.0183
	3345.5	(10)	34.11	5/2-3/2	0.177
	3319.8		34.14	3/2-1/2	0.148

	Wavelength [Å][4]		E^2	J-J'[3]	$f_{J,J}$
Ne II	3345.9	(10)	34.11	3/2-3/2	0.0295
	3230.2	(11)	34.24	5/2-5/2	0.285
	3232.4		34.24	3/2-3/2	0.275
	3252.0		34.24	5/2-3/2	0.0204
	3329.2	(12)	34.46	7/2-7/2	0.110
	3357.9		34.47	5/2-5/2	0.0741
	3374.1		34.48	3/2-3/2	0.0515
	3379.4		34.50	1/2-1/2	0.0646
	3320.3		34.47	7/2-5/2	0.0184
	3345.9		34.48	5/2-3/2	0.0301
	3362.9		34.50	3/2-1/2	0.0323
	3367.1		34.46	5/2-7/2	0.0244
	3386.2		34.47	3/2-5/2	0.0449
	3390.6		34.48	1/2-3/2	0.0643
	3218.2	(13)	34.59	7/2-9/2	0.666
	3198.6		34.65	5/2-7/2	0.618
	3190.9		34.69	3/2-5/2	0.611
	3213.7		34.68	1/2-3/2	0.762
	3164.5		34.65	7/2-7/2	0.0774
	3165.7		34.69	5/2-5/2	0.133
	3198.9		34.68	3/2-3/2	0.152
	3132.2		34.69	7/2-5/2	0.00390
	3173.6		34.68	5/2-3/2	0.00724
	3118.0	(16)	34.71	7/2-5/2	0.00914
	3169.3		34.69	5/2-3/2	0.00636
	3151.2		34.71	5/2-5/2	0.00274
	3194.6		34.69	3/2-3/2	0.00485
	3176.2		34.71	3/2-5/2	0.000456
	3209.4		34.69	1/2-3/2	0.00151
	3039.7	(17)	34.81	7/2-5/2	0.137
	3036.0		34.86	5/2-3/2	0.0940
	3030.9		34.90	3/2-1/2	0.0551
	3071.1		34.81	5/2-5/2	0.0417
	3059.2		34.86	3/2-3/2	0.0726
	3044.2		34.90	1/2-1/2	0.111
	3072.7		34.86	1/2-3/2	0.0229
	3417.7	(20)	34.60	5/2-7/2	0.705
	3414.8		34.66	3/2-5/2	0.753
	3356.4		34.66	5/2-5/2	0.0359
	3416.9	(21)	34.60	5/2-5/2	0.123
	3453.1		34.62	3/2-3/2	0.119
	3477.7		34.60	3/2-5/2	0.0132
	3255.4	(23)	34.78	5/2-3/2	0.00924
	3353.6		34.73	3/2-1/2	0.00760
	3310.6		34.78	3/2-3/2	0.00154
	3094.1	(24)	34.98	5/2-3/2	0.134
	3088.2		35.05	3/2-1/2	0.108
	3143.7		34.98	3/2-3/2	0.0230
	3456.7	(28)	34.78	1/2-3/2	0.612

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
Ne II	3503.6	(28)	34.73	1/2-1/2	0.302
	3275.2	(29)	34.98	1/2-3/2	0.0986
	3542.9	(34)	34.71	3/2-5/2	0.449
	3565.8		34.69	3/2-3/2	0.297
	3594.2		34.66	3/2-1/2	0.147
	3442.1	(36)	34.81	3/2-3/2	0.0832
	3397.9		34.86	3/2-3/2	0.0539
	3829.8	(39)	34.60	3/2-5/2	0.576
	3818.4		34.62	1/2-3/2	0.645
	3800.0		34.62	3/2-3/2	0.0646
	3628.1	(41)	34.78	3/2-3/2	0.189
	3697.1		34.73	1/2-1/2	0.149
	3679.8		34.73	3/2-1/2	0.0373
	3644.9		34.78	1/2-3/2	0.0757
	3428.8	(42)	34.98	3/2-3/2	0.133
	3377.2		35.05	1/2-1/2	0.102
	3443.7		34.98	1/2-3/2	0.0534
	3229.5	(43)	37.70	7/2-9/2	0.654
	3224.8		37.70	5/2-7/2	0.673
	3097.2	(44)	37.86	7/2-5/2	0.0259
	3092.9		37.86	5/2-5/2	0.00173
	3411.4	(45)	37.72	3/2-3/2	0.325
	3440.8		37.72	1/2-1/2	0.260
	3413.1		37.72	3/2-1/2	0.0650
	3439.0		37.72	1/2-3/2	0.130
	3336.1	(46)	37.81	3/2-3/2	0.0311
	3050.6	(48)	38.15	3/2-1/2	0.191
	3072.7		38.15	1/2-1/2	0.191
	3480.8	(49)	37.70	1/2-3/2	0.569
	3479.5		37.70	1/2-1/2	0.284
	3542.3	(50)	37.72	5/2-3/2	0.0772
	3538.0		37.72	3/2-1/2	0.0644
	3539.9		37.72	3/2-3/2	0.0129
	3406.9	(51)	37.86	5/2-5/2	0.293
	3457.2		37.81	3/2-3/2	0.278
	3459.4		37.81	5/2-3/2	0.0206
	3404.8		37.86	3/2-5/2	0.0314
	4219.8	(52)	37.38	7/2-7/2	0.0885
	4231.6		37.39	5/2-5/2	0.0597
	4240.0		37.39	3/2-3/2	0.0415
	4242.2		37.40	1/2-1/2	0.0519
	4217.2		37.39	7/2-5/2	0.0148
	4220.9		37.39	5/2-3/2	0.0241
	4224.6		37.40	3/2-1/2	0.0259
	4250.7		37.39	3/2-5/2	0.0364
	4257.8		37.39	1/2-3/2	0.0521
	4206.4	(53)	37.39	7/2-9/2	0.736
	4080.5		37.51	3/2-5/2	0.636
	4150.7		37.47	1/2-3/2	0.813

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
Ne II	4098.8	(53)	37.47	7/2-7/2	0.0819
	4062.9		37.51	5/2-5/2	0.138
	4133.7		37.47	3/2-3/2	0.162
	4412.5	(55)	37.38	9/2-7/2	0.00218
	4514.8		37.39	7/2-5/2	0.00190
	4535.5		37.40	3/2-1/2	0.00156
	4517.8		37.38	7/2-7/2	0.000317
	4553.2		37.39	3/2-3/2	0.000625
	4565.5		37.39	3/2-5/2	0.000045
	4397.9	(56)	37.39	9/2-9/2	0.0699
	4379.5		37.47	7/2-7/2	0.0581
	4385.0		37.51	5/2-5/2	0.0525
	4430.9		37.47	3/2-3/2	0.0616
	4446.5		37.47	5/2-3/2	0.0103
	4502.5		37.39	7/2-9/2	0.00809
	4442.7		37.47	5/2-7/2	0.0138
	4369.8		37.51	3/2-5/2	0.0152
	4391.9	(57)	37.46	7/2-9/2	0.789
	4409.3		37.49	5/2-7/2	0.793
	4413.2		37.48	3/2-5/2	0.889
	4428.5		37.48	5/2-5/2	0.0955
	4365.7		37.48	7/2-5/2	0.00262
	4616.0	(64)	37.38	5/2-7/2	0.795
	4574.5		37.39	3/2-5/2	0.622
	4612.9		37.39	5/2-5/2	0.179
	4562.1		37.39	3/2-3/2	0.316
	4498.9		37.40	1/2-1/2	0.489
	4600.1		37.39	5/2-3/2	0.0198
	4544.1		37.40	3/2-1/2	0.0493
	4511.4	(70)	37.51	3/2-5/2	0.888
	4511.3		37.46	1/2-3/2	0.987
	4432.3	(74)	40.49	3/2-5/2	0.520
	4431.7		40.49	1/2-3/2	0.578
	4429.6		40.49	3/2-5/2	0.520
Na I	5890.0	(1)	2.10	1/2-3/2	0.624
	5895.9		2.09	1/2-1/2	0.312
	3302.3	(2)	3.74	1/2-3/2	0.00974
	3302.9		3.74	1/2-1/2	0.00481
	11403.6	(3)	3.18	3/2-1/2	0.163
	11381.2		3.18	1/2-1/2	0.162
	8194.8	(4)	3.60	3/2-5/2	0.753
	8183.3		3.60	1/2-3/2	0.836
	8194.8		3.60	3/2-3/2	0.0837
	6160.7	(5)	4.10	3/2-1/2	0.0131
	6154.2		4.10	1/2-1/2	0.0132
	5688.2	(6)	4.27	3/2-5/2	0.0855
	5682.6		4.27	1/2-3/2	0.0952
	5688.2		4.27	3/2-3/2	0.00950

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
Na I	5153.4	(8)	4.49	3/2-1/2	0.00418
	5148.8		4.49	1/2-1/2	0.00418
	4982.8	(9)	4.57	3/2-5/2	0.0258
	4978.5		4.57	1/2-3/2	0.0288
	4751.8	(11)	4.69	3/2-1/2	0.00192
	4747.9		4.69	1/2-1/2	0.00192
	10745.9	(18)	4.33	1/2-3/2	0.0254
	10748.7		4.33	1/2-1/2	0.0126
	12679.0	(21)	4.57	3/2-5/2	0.160
	10834.4	(22)	4.74	3/2-5/2	0.0541
Mg I	5183.6	(2)	5.09	2 - 1	0.0721
	5172.7		5.09	1 - 1	0.0719
	5167.3		5.09	0 - 1	0.0717
	3838.3	(3)	5.92	2 - 3	0.361
	3832.3		5.92	1 - 2	0.321
	3829.4		5.92	0 - 1	0.428
	3838.3		5.92	2 - 2	0.0644
	3832.3		5.92	1 - 1	0.107
	3336.7	(4)	6.40	2 - 1	0.00805
	3332.2		6.40	1 - 1	0.00802
	3329.9		6.40	0 - 1	0.00803
	3096.9	(5)	6.69	2 - 3	0.103
	3096.9		6.69	2 - 2	0.0184
	3096.9		6.69	2 - 1	0.00123
	3093.0		6.69	1 - 2	0.0920
	3093.0		6.69	1 - 1	0.0307
	3091.1		6.69	0 - 1	0.123
	11828.8	(6)	5.37	1 - 0	0.165
	8806.8	(7)	5.73	1 - 2	0.710
	5711.1	(8)	6.49	1 - 0	0.00883
	5528.4	(9)	6.56	1 - 2	0.00320
	4730.0	(10)	6.94	1 - 0	0.00267
	4703.0	(11)	6.95	1 - 2	0.0135
	4354.5	(13)	7.16	1 - 0	0.00121
	4351.9	(14)	7.16	1 - 2	0.00759
	7657.6	(22)	6.70	1 - 2	0.0242
	6318.2	(23)	7.04	1 - 2	0.00583
	6318.8		7.04	1 - 2	0.00583
	6318.8		7.04	1 - 1	0.00347
	6318.8		7.04	1 - 0	0.00116
	8923.8	(25)	6.75	0 - 1	0.0397
	12083.8	(26)	6.75	2 - 3	0.585
	9256.0	(27)	7.06	2 - 3	0.181
	8213.0	(28)	7.23	2 - 3	0.0821
	10966.1	(35)	7.03	2 - 3	0.112
	10966.1		7.03	2 - 2	0.0199
	10966.1		7.03	2 - 1	0.00133
	10961.2		7.03	1 - 2	0.0996

	Wavelength [Å][4]		E^{3}	J-J'[3]	$f_{J'J}$
Mg I	10961.2	(35)	7.03	1 - 1	0.0332
	10961.2		7.03	0 - 1	0.133
	9993.7	(36)	7.14	2 - 1	0.00674
	9987.0		7.14	1 - 1	0.00675
	9987.0		7.14	0 - 1	0.00675
	10812.8	(37)	7.06	1 - 2	0.185
	9415.5	(38)	7.23	1 - 2	0.0730
Mg II	9217.4	(1)	9.96	1/2-3/2	0.914
	9243.4		9.95	1/2-1/2	0.456
	3613.8	(2)	12.03	1/2-3/2	0.000628
	3615.6		12.03	1/2-1/2	0.000269
	10914.2	(3)	9.96	5/2-3/2	0.178
	10949.4		9.95	3/2-1/2	0.149
	4481.3	(4)	11.58	5/2-7/2	0.934
	4481.3		11.58	5/2-5/2	0.0467
	4481.1		11.58	3/2-5/2	0.981
	3848.2	(5)	12.03	5/2-3/2	0.00431
	3850.4		12.03	3/2-1/2	0.00355
	3104.8	(6)	12.80	5/2-7/2	0.156
	3104.8		12.80	5/2-5/2	0.00781
	3104.7		12.80	3/2-5/2	0.164
	8238.4	(7)	11.45	3/2-1/2	0.264
	8217.8		11.45	1/2-1/2	0.263
	7896.4	(8)	11.52	3/2-5/2	1.112
	7896.4		11.52	3/2-3/2	0.124
	7877.1		11.52	1/2-3/2	1.234
	4434.0	(9)	12.74	3/2-1/2	0.0295
	4428.0		12.74	1/2-1/2	0.0295
	4390.6	(10)	12.77	3/2-5/2	0.0694
	4390.6		12.77	3/2-3/2	0.00771
	4384.6		12.77	1/2-3/2	0.0777
	3553.5	(11)	13.43	3/2-1/2	0.0102
	3549.6		13.43	1/2-1/2	0.0102
	3538.9	(12)	13.44	3/2-5/2	0.0166
	3538.9		13.44	3/2-3/2	0.00184
	3535.0		13.44	1/2-3/2	0.0186
	3175.8	(13)	13.84	3/2-1/2	0.00489
	3172.8		13.84	1/2-1/2	0.00490
	9633.0	(15)	12.80	3/2-5/2	0.804
	6346.7	(16)	13.46	3/2-5/2	0.183
	5264.1	(17)	13.86	3/2-5/2	0.0726
Al I	3961.5	(1)	3.13	3/2-1/2	0.0513
	3944.0		3.13	1/2-1/2	0.0508
	3092.7	(3)	4.00	3/2-5/2	0.370
	3082.2		4.00	1/2-3/2	0.409
	3092.8		4.00	3/2-3/2	0.0411
	13123.4	(4)	4.07	1/2-3/2	0.810
	13150.7		4.07	1/2-1/2	0.404

	Wavelength [Å][4]		E^{3}	J-J'[3]	$f_{J'J}$
Al I	6696.0	(5)	4.97	1/2-3/2	0.0225
	6698.6		4.97	1/2-1/2	0.0111
	5557.1	(6)	5.35	1/2-3/2	0.00479
	5558.0		5.35	1/2-1/2	0.00234
	11255.7	(8)	5.10	5/2-7/2	0.479
	11255.7		5.10	5/2-5/2	0.0239
	11255.8		5.10	3/2-5/2	0.503
	8773.9	(9)	5.41	5/2-7/2	0.160
	8773.9		5.41	5/2-5/2	0.00801
	8772.9		5.41	3/2-5/2	0.168
	7836.2	(10)	5.58	5/2-7/2	0.0756
	7836.2		5.58	5/2-5/2	0.00378
	7835.3		5.58	3/2-5/2	0.0793
	10891.2	(12)	5.20	3/2-1/2	0.0200
	10872.5		5.20	1/2-1/2	0.0200
	10782.1	(13)	5.21	3/2-5/2	0.0130
	10768.4		5.21	1/2-3/2	0.0144
	10786.8		5.21	3/2-3/2	0.00140
	8923.6	(14)	5.45	3/2-5/2	0.00190
	8912.9		5.45	1/2-3/2	0.00213
	8841.3	(15)	5.47	3/2-1/2	0.00649
	8828.9		5.47	1/2-1/2	0.00651
Al II	7042.1	(3)	13.02	1 - 2	0.727
	7056.6		13.02	1 - 1	0.435
	7063.6		13.01	1 - 0	0.145
	8640.7	(4)	13.20	0 - 1	1.241
	3275.8	(5)	15.54	0 - 1	0.00406
	10076.3	(6)	13.02	3 - 2	0.144
	10107.2		13.02	2 - 1	0.108
	10122.5		13.01	1 - 0	0.0796
	10077.3		13.02	2 - 2	0.0359
	10077.5		13.02	2 - 2	0.0359
	10108.0		13.02	1 - 1	0.0598
	10108.4		13.02	1 - 1	0.0598
	3586.6	(7)	15.24	3 - 4	0.720
	3587.1		15.24	2 - 3	0.697
	3587.5		15.24	1 - 2	0.785
	3586.9		15.24	3 - 3	0.0623
	3587.3		15.24	2 - 2	0.0872
	3587.2		15.24	3 - 2	0.00178
	3313.3	(8)	15.52	3 - 2	0.00291
	3314.9		15.52	2 - 1	0.00216
	3315.6		15.52	1 - 0	0.00159
	3313.5		15.52	2 - 2	0.000726
	3315.0		15.52	1 - 1	0.00120
	6837.1	(9)	14.83	2 - 1	0.238
	6823.5		14.83	1 - 1	0.237
	6816.7		14.83	0 - 1	0.237
	6243.4	(10)	15.00	2 - 3	0.964

	Wavelength [Å][4]		E^{3}	J-J'[3]	$f_{J'J}$
Al II	6231.8	(10)	15.00	1 - 2	0.860
	6226.2		15.00	0 - 1	1.146
	3738.0	(11)	16.32	2 - 1	0.0269
	3733.9		16.32	1 - 1	0.0269
	3732.0		16.32	0 - 1	0.0269
	3655.0	(12)	16.40	2 - 3	0.0771
	3651.1		16.40	1 - 2	0.0691
	3026.8	(13)	17.10	2 - 1	0.00935
	3024.1		17.10	1 - 1	0.00935
	3022.8		17.10	0 - 1	0.00935
	2938.2	(14)	17.14	2 - 3	0.0208
	2938.2		17.14	2 - 2	0.00571
	2938.2		17.14	2 - 1	0.000247
	2995.5		17.14	1 - 2	0.0187
	2995.5		17.14	1 - 1	0.00622
	2994.3		17.14	0 - 1	0.0249
	6920.0	(15)	14.98	1 - 0	0.226
	5593.2	(16)	15.41	1 - 2	0.847
	3866.2	(17)	16.39	1 - 0	0.0276
	3703.2	(18)	16.53	1 - 2	0.131
	3135.9	(19)	17.13	1 - 0	0.00968
	3088.5	(20)	17.19	1 - 2	0.0364
	7471.4	(21)	15.24	2 - 3	1.097
	6335.7	(22)	15.54	2 - 1	0.0501
	4026.5	(24)	16.66	2 - 1	0.00927
	3428.9	(25)	17.19	2 - 3	0.000322
	3074.7	(27)	17.60	2 - 3	0.00216
	6696.4	(29)	16.67	1 - 2	0.00426
	6699.5		16.67	1 - 1	0.00244
	4398.4	(30)	17.29	1 - 0	0.000002
	5388.5	(34)	17.27	0 - 1	0.0162
	8354.4	(40)	16.47	3 - 4	0.671
	8359.6		16.47	2 - 3	0.652
	8363.5		16.47	1 - 2	0.736
	8359.2		16.47	3 - 3	0.0582
	8363.3		16.47	2 - 2	0.0817
	5853.6	(41)	17.11	3 - 4	0.154
	5861.5		17.10	2 - 3	0.148
	5867.8		17.10	1 - 2	0.165
	6495.5	(65)	17.14	4 - 3	0.00470
	6917.9	(75)	17.19	2 - 3	0.156
	5613.2	(77)	17.60	2 - 3	0.0462
	7823.7	(90)	17.10	2 - 1	0.0387
	7815.8		17.10	1 - 1	0.0387
	7812.3		17.10	0 - 1	0.0387
	7637.3	(91)	17.14	2 - 3	0.106
	7635.3		17.14	2 - 2	0.0190
	7635.3		17.14	2 - 1	0.00126
	7627.9		17.14	1 - 2	0.0951

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
Al II	7627.9	(91)	17.14	1 - 1	0.0317
	7624.5		17.14	0 - 1	0.127
	6073.2	(92)	17.55	2 - 1	0.0135
	6068.5		17.55	1 - 1	0.0135
	6066.3		17.55	0 - 1	0.0136
	6066.4		17.55	0 - 1	0.0136
	6006.4	(93)	17.57	2 - 3	0.0255
	6006.4		17.57	2 - 2	0.00455
	6006.4		17.57	2 - 1	0.000303
	6001.8		17.57	1 - 2	0.0229
	6001.8		17.57	1 - 1	0.00763
	5999.7		17.57	0 - 1	0.0306
	5999.8		17.57	0 - 1	0.0306
	7449.4	(98)	17.19	1 - 2	0.163
	6061.1	(99)	17.57	1 - 0	0.0143
	5971.9	(100)	17.60	1 - 2	0.0440
Al III	3601.6	(1)	17.74	5/2-3/2	0.170
	3612.4		17.73	3/2-1/2	0.142
	3601.9		17.74	3/2-3/2	0.0284
	5696.5	(2)	17.74	1/2-3/2	0.844
	5722.7		17.73	1/2-1/2	0.420
	4529.2	(3)	20.47	3/2-5/2	1.147
	4512.5		20.47	1/2-3/2	1.275
	4528.9		20.47	3/2-3/2	0.127
	3713.1	(4)	21.07	3/2-1/2	0.229
	3702.1		21.07	1/2-1/2	0.228
	4149.9	(5)	23.44	5/2-7/2	0.713
	4150.1		23.44	3/2-5/2	0.748
	4149.9		23.44	5/2-5/2	0.0356
	4701.7	(6)	23.32	5/2-3/2	0.0175
	4364.6	(9)	24.86	3/2-5/2	0.0353
	4364.6		24.86	3/2-3/2	0.00392
	4357.2		24.86	1/2-3/2	0.0400
	3287.4	(10)	25.79	3/2-5/2	0.00259
	3287.4		25.79	3/2-3/2	0.000288
	3283.1		25.79	1/2-3/2	0.00302
	4903.7	(11)	25.83	3/2-5/2	0.177
	3980.6	(12)	26.42	3/2-5/2	0.0757
	5260.9	(13)	25.79	5/2-3/2	0.00774
Si I	3905.5	(3)	5.06	0 - 1	0.0557
	12031.5	(4)	5.96	2 - 3	0.516
	11984.		5.94	1 - 2	0.457
	11991.6		5.93	0 - 1	0.606
	12270.5		5.94	2 - 2	0.0909
	12103.5		5.93	1 - 1	0.151
	12396.0		5.93	2 - 1	0.00601
	10827.1	(5)	6.07	2 - 2	0.292
	10749.4		6.06	1 - 1	0.0971
Si I	10929.3	(5)	6.06	2 - 1	0.0971
	10786.9		6.05	1 - 0	0.129
	10603.4		6.07	1 - 2	0.162
	10661.0		6.06	0 - 1	0.388
	10585.1	(6)	6.10	2 - 1	0.131
	10371.2		6.10	1 - 1	0.130
	10288.8		6.10	0 - 1	0.130
	5797.9	(9)	7.06	2 - 3	0.0149
	5793.1		7.04	1 - 2	0.00887
	5780.5		7.03	0 - 1	0.0107
	5789.2		7.04	2 - 2	0.00153
	5708.4	(10)	7.09	2 - 2	0.0141
	5690.5		7.08	1 - 1	0.00380
	5754.3		7.08	2 - 1	0.00354
	5701.1		7.07	1 - 0	0.00473
	5645.7		7.09	1 - 2	0.00832
	5665.6		7.08	0 - 1	0.0156
	5684.5	(11)	7.10	2 - 1	0.00719
	5622.2		7.09	1 - 1	0.00755
	5769.5	(13)	8.20	1 - 2	0.666
	5413.6	(14)	8.37	1 - 0	0.124
	5948.6	(16)	7.14	1 - 2	0.0404
	5772.3	(17)	7.20	1 - 0	0.0130
	8417.9	(18)	7.06	3 - 3	0.000132
	8527.3		7.04	2 - 2	0.0000442
	8398.0		7.06	2 - 3	0.000024
	8514.6		7.04	1 - 2	0.000015
	8230.7	(19)	7.09	3 - 2	0.00104
	8306.8		7.08	2 - 1	0.000563
	8317.5		7.07	1 - 0	0.000377
	8211.5		7.09	2 - 2	0.000261
	7423.5	(23)	7.26	3 - 4	0.0868
	7409.1		7.26	2 - 3	0.0830
	7405.9		7.26	1 - 2	0.0958
	7424.6		7.26	3 - 3	0.00756
	7415.4		7.26	2 - 2	0.0108
	7250.7	(25)	7.30	3 - 3	0.00151
	7193.6		7.31	2 - 2	0.000327
	7184.9		7.31	1 - 1	0.000336
	7208.2		7.31	3 - 2	0.000058
	7193.9		7.31	2 - 1	0.000071
	7235.9		7.30	2 - 3	0.000252
	7184.5		7.31	1 - 2	0.000111
	6254.3	(28)	7.57	3 - 4	0.0340
	6243.9		7.57	2 - 3	0.0327
	6237.3		7.57	1 - 2	0.0365
	6255.0		7.57	3 - 3	0.00297
	6244.1		7.57	2 - 2	0.00410
	6142.5	(30)	7.60	3 - 3	0.000022
Si I	6131.5	(30)	7.60	2 - 2	0.000022
	6124.9		7.60	1 - 1	0.000028
	6131.9		7.60	2 - 3	0.000005
	6125.0		7.60	1 - 2	0.000009
	6142.2		7.60	3 - 2	0.000003
	6131.3		7.60	2 - 1	0.000005
	10844.0	(31)	6.98	1 - 2	0.484
	8093.3	(34)	7.36	1 - 1	0.0151
	7680.4	(36)	7.44	1 - 2	0.0924
	6848.7	(37)	7.64	1 - 1	0.00390
	6722.7	(38)	7.67	1 - 2	0.0376
	11018.0	(39)	6.97	2 - 1	0.00423
	9570.1	(42)	7.14	2 - 2	0.000243
	8752.2	(43)	7.26	2 - 3	0.231
	8501.5	(47)	7.30	2 - 2	0.0148
	7165.6	(48)	7.57	2 - 2	0.0113
	10727.2	(53)	7.11	3 - 4	0.260
	10694.1		7.09	2 - 3	0.278
	10689.5		7.08	1 - 2	0.331
	10882.7		7.09	3 - 3	0.0261
	10784.3		7.08	2 - 2	0.0377
	8893.0	(54)	7.35	3 - 2	0.0195
	8949.3		7.32	2 - 1	0.0147
	8925.6		7.31	1 - 0	0.0109
	8766.7		7.35	2 - 2	0.00481
	8883.8		7.32	1 - 1	0.00814
	7943.9	(57)	7.51	3 - 4	0.0585
	7932.2		7.49	2 - 3	0.0705
	7918.4		7.49	1 - 2	0.0847
	8035.4		7.49	3 - 3	0.00651
	7970.3		7.49	2 - 2	0.00956
	7373.0	(58)	7.63	3 - 2	0.00592
	7285.9		7.63	2 - 2	0.00144
	7005.8	(60)	7.72	3 - 4	0.0149
	7003.6		7.70	2 - 3	0.0288
	6976.5		7.70	1 - 2	0.0342
	7084.3		7.70	3 - 3	0.00266
	10067.8	(64)	7.30	2 - 3	0.000159
	10025.8		7.29	1 - 2	0.00106
	9967.5		7.29	0 - 1	0.000567
	10155.9		7.29	2 - 2	0.000374
	10001.4		7.29	1 - 1	0.000188
	9689.4	(65)	7.35	2 - 2	0.0155
	9789.2		7.32	1 - 1	0.00470
	9913.2		7.32	2 - 1	0.00463
	9839.6		7.31	1 - 0	0.00605
	9570.1		7.35	1 - 2	0.00855
	9758.1		7.32	0 - 1	0.0189
	9510.2	(66)	7.40	2 - 2	0.0153

	Wavelength [Å][4]	E[2]	J-J'[3]	$f_{J,J}$
Si I	9238.6 (66)	7.41	2 - 1	0.00616
	9103.4	7.41	1 - 0	0.00870
	9208.6	7.40	1 - 2	0.00894
	9103.4	7.41	0 - 1	0.0253
	8070.6 (67)	7.60	2 - 3	0.000001
	8086.2	7.58	1 - 2	0.00261
	7912.6 (68)	7.63	2 - 2	0.00523
	7858.4 (69)	7.63	2 - 2	0.00314
	9891.9 (71)	7.35	1 - 2	0.0116
	9505.3 (72)	7.40	1 - 2	0.0419
	9421.8	7.41	1 - 1	0.0305
	9393.4	7.41	1 - 0	0.0109
	8046.8 (73)	7.63	1 - 2	0.00403
	7392.2 (75)	7.77	1 - 2	0.00189
	7455.5	7.75	1 - 1	0.000872
	11468.5 (76)	7.26	4 - 4	0.0388
	11202.0	7.26	2 - 2	0.0352
	11308.5	7.26	3 - 2	0.00321
	11290.0	7.26	3 - 4	0.00322
	11187.7	7.26	2 - 3	0.00437
	10982.3 (77)	7.29	3 - 4	0.341
	10885.2	7.29	2 - 3	0.356
	10984.2	7.29	3 - 3	0.0228
	8899.0 (79)	7.57	4 - 4	0.0126
	8790.9	7.57	3 - 3	0.0111
	8729.0	7.57	2 - 2	0.0117
	8899.5	7.57	4 - 3	0.000844
	8751.3	7.57	3 - 2	0.00105
	8790.9	7.57	3 - 4	0.00106
	8728.4	7.57	2 - 3	0.00146
	8596.0 (80)	7.60	3 - 4	0.0886
	8536.4	7.60	2 - 3	0.0927
	8597.0	7.60	3 - 3	0.00592
	7850.5 (81)	7.74	3 - 2	0.000494
	7800.0	7.74	2 - 2	0.00549
	11607.4 (82)	7.26	2 - 1	0.000834
	11485.7 (83)	7.27	2 - 3	0.0499
	10582.7 (84)	7.36	2 - 1	0.0210
	9886.9 (85)	7.44	2 - 2	0.0170
	8899.0 (86)	7.58	2 - 3	0.0172
	8550.3 (88)	7.64	2 - 1	0.00748
	11611.5 (90)	7.30	2 - 3	0.359
	11592.0	7.31	1 - 2	0.294
	11640.6	7.31	0 - 1	0.397
	11502.9	7.31	2 - 2	0.0576
	11592.0	7.31	1 - 1	0.0981
	9009.0 (91)	7.60	2 - 3	0.0922
	9064.1	7.60	1 - 2	0.0836
	9009.0	7.60	2 - 2	0.0164

	Wavelength [Å][4]	E[2]	J-J'[3]	$f_{J,J}$
Si II	6347.1 (2)	10.03	1/2-3/2	0.820
	6371.4	10.02	1/2-1/2	0.409
	4130.9 (3)	12.78	5/2-7/2	0.869
	4130.9	12.78	5/2-5/2	0.0435
	4128.1	12.78	3/2-5/2	0.912
	5979.0 (4)	12.09	3/2-1/2	0.215
	5957.6	12.09	1/2-1/2	0.212
	5056.0 (5)	12.47	3/2-5/2	0.888
	5041.1	12.47	1/2-3/2	0.978
	5056.4	12.47	3/2-3/2	0.0987
	3339.8 (6)	13.73	3/2-1/2	0.0253
	3333.2	13.73	1/2-1/2	0.0252
	3210.0 (7)	13.87	3/2-5/2	0.108
	3210.0	13.87	3/2-3/2	0.0120
	3203.9	13.87	1/2-3/2	0.120
Si III	3086.2 (1)	21.63	3 - 2	0.143
	3093.4	21.62	2 - 1	0.108
	3096.8	21.62	1 - 0	0.0797
	3086.4	21.63	2 - 2	0.0358
	3093.6	21.62	1 - 1	0.0597
	3086.6	21.63	1 - 2	0.00398
	4552.7 (2)	21.63	1 - 2	0.691
	4567.9	21.62	1 - 1	0.413
	4574.8	21.62	1 - 0	0.138
	5739.8 (4)	21.79	0 - 1	1.097
	3806.6 (5)	24.88	2 - 3	1.038
	3806.6	24.88	2 - 2	0.185
	3806.6	24.88	2 - 1	0.0124
	3796.1	24.88	1 - 2	0.927
	3796.1	24.88	1 - 1	0.309
	3791.4	24.88	0 - 1	1.236
	3241.7 (6)	25.44	2 - 1	0.214
	3234.0	25.44	1 - 1	0.213
	3230.6	25.44	0 - 1	0.212
	3590.5 (7)	25.22	1 - 2	1.250
	3185.2 (8)	25.66	1 - 0	0.191
	3126.3 (11)	30.62	2 - 2	0.0456
	3147.4	30.60	2 - 1	0.0153
	3258.7 (12)	30.62	3 - 2	0.113
	3270.3	30.60	2 - 1	0.0849
	3279.3	30.59	1 - 0	0.0629
	3253.4	30.62	2 - 2	0.0282
	4683.0 (13)	30.62	2 - 2	0.312
	4665.9	30.60	1 - 1	0.104
	4685.8	30.59	1 - 0	0.198
	4668.1	30.60	0 - 1	0.417
Si IV	4088.9 (1)	26.97	1/2-3/2	0.770
	4116.1	26.95	1/2-1/2	0.382
	3165.7 (2)	30.86	3/2-5/2	1.075

	Wavelength [Å][4]	E[2]	J-J'[3]	$f_{J,J}$
Si IV	3149.6 (2)	30.86	1/2-3/2	1.197
	3762.4 (3)	34.14	5/2-3/2	0.295
	3773.1	34.13	3/2-1/2	0.247
	4328.2 (4)	37.00	3/2-1/2	0.296
	4314.2	37.00	1/2-1/2	0.293
	4212.4 (5)	38.92	3/2-5/2	0.610
A II	4401.0 (1)	19.14	7/2-5/2	0.0305
	4371.4	19.18	5/2-3/2	0.0216
	4332.1	19.22	3/2-1/2	0.0130
	4431.0	19.14	5/2-5/2	0.00924
	4400.1	19.18	3/2-3/2	0.0166
	4352.2	19.22	1/2-1/2	0.0261
	4460.6	19.14	3/2-5/2	0.00155
	4420.9	19.18	1/2-3/2	0.00521
	4013.9 (2)	19.41	7/2-7/2	0.00869
	3968.4	19.46	5/2-5/2	0.00588
	3914.8	19.53	3/2-3/2	0.00411
	3891.4	19.56	1/2-1/2	0.00515
	3944.3	19.46	7/2-5/2	0.00145
	3892.0	19.53	5/2-3/2	0.00237
	3875.3	19.56	3/2-1/2	0.00256
	4038.8	19.41	5/2-7/2	0.00195
	3992.1	19.46	3/2-5/2	0.00361
	3931.2	19.53	1/2-3/2	0.00517
	4806.1 (6)	19.14	5/2-5/2	0.221
	4933.2	19.18	3/2-3/2	0.0418
	4972.2	19.22	1/2-1/2	0.0524
	4735.9	19.18	5/2-3/2	0.0960
	4847.9	19.22	3/2-1/2	0.133
	5009.4	19.14	3/2-5/2	0.139
	5062.1	19.18	1/2-3/2	0.257
	4348.1 (7)	19.41	5/2-7/2	0.464
	4426.0	19.46	3/2-5/2	0.365
	4430.2	19.53	1/2-3/2	0.293
	4266.5	19.46	5/2-5/2	0.106
	4331.3	19.53	3/2-3/2	0.189
	4379.7	19.56	1/2-1/2	0.296
	4178.4	19.53	5/2-3/2	0.0120
	4282.9	19.56	3/2-1/2	0.0299
	3729.3 (10)	19.88	5/2-3/2	0.131
	3850.6	19.88	3/2-3/2	0.130
	3928.6	19.88	1/2-3/2	0.129
	4879.9 (14)	19.60	3/2-5/2	0.509
	4965.1	19.68	1/2-3/2	0.569
	4726.9	19.68	3/2-3/2	0.0583
	4545.1 (15)	19.78	3/2-3/2	0.302
	4889.1	19.72	1/2-1/2	0.231
	4657.9	19.72	3/2-1/2	0.0591

Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
A II	4764.9 (15)	19.78	1/2-3/2	0.118
	4376.0 (17)	19.89	3/2-1/2	0.125
	4579.4	19.89	1/2-1/2	0.123
	6643.8 (20)	19.41	9/2-7/2	0.0609
	6684.4	19.46	7/2-5/2	0.0535
	6638.2	19.53	5/2-3/2	0.0476
	6639.7	19.56	3/2-1/2	0.0452
	6886.6	19.41	7/2-7/2	0.00878
	6863.5	19.46	5/2-5/2	0.0153
	6756.6	19.53	3/2-3/2	0.0179
	7077.0	19.41	5/2-7/2	0.000588
	6990.2	19.46	3/2-5/2	0.00126
	6808.6 (24)	19.68	1/2-3/2	0.00194
	7284.3	19.68	3/2-3/2	0.000196
	6861.3 (25)	19.78	3/2-3/2	0.0247
	6666.4	19.72	1/2-1/2	0.0191
	6437.6	19.78	1/2-3/2	0.00971
	6483.1 (27)	19.89	3/2-1/2	0.0405
	6103.6	19.89	1/2-1/2	0.0397
	4609.6 (31)	21.05	5/2-7/2	0.444
	4589.9	21.04	3/2-5/2	0.466
	4637.3	21.04	5/2-5/2	0.0221
	4277.6 (32)	21.26	5/2-3/2	0.214
	4131.7	21.33	3/2-1/2	0.184
	4237.2	21.26	3/2-3/2	0.0359
	4072.0 (33)	21.41	5/2-5/2	0.349
	4042.9	21.40	3/2-3/2	0.337
	4079.6	21.40	5/2-3/2	0.0249
	4035.5	21.41	3/2-5/2	0.0375
	3765.3 (42)	22.42	5/2-5/2	0.0972
	3720.4	22.50	3/2-3/2	0.0173
	3669.6	22.59	1/2-1/2	0.0197
	3678.3	22.50	5/2-3/2	0.0378
	3622.2	22.59	3/2-1/2	0.0477
	3809.5	22.42	3/2-5/2	0.0641
	3770.5	22.50	1/2-3/2	0.111
	3491.5 (44)	22.67	5/2-7/2	0.585
	3514.4	22.69	3/2-5/2	0.461
	3535.3	22.71	1/2-3/2	0.366
	3476.7	22.69	5/2-5/2	0.131
	3491.2	22.71	3/2-3/2	0.232
	3509.8	22.74	1/2-1/2	0.362
	3454.1	22.71	5/2-3/2	0.0144
	3466.3	22.74	3/2-1/2	0.0359
	3139.0 (47)	23.07	5/2-5/2	0.130
	3212.5	23.02	3/2-3/2	0.0265
	3281.7	22.98	1/2-1/2	0.0347
	3181.1	23.02	5/2-3/2	0.0588
	3243.7	22.98	3/2-1/2	0.0854

Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
A II	3169.7 (47)	23.07	3/2-5/2	0.0851
	3249.8	23.02	1/2-3/2	0.168
	4103.9 (52)	22.42	7/2-5/2	0.164
	4072.4	22.50	5/2-3/2	0.110
	4033.8	22.59	3/2-1/2	0.0415
	4179.3	22.42	5/2-5/2	0.0503
	4156.1	22.50	3/2-3/2	0.0869
	4076.6	22.59	1/2-1/2	0.126
	4267.5	22.42	3/2-5/2	0.00878
	4201.6	22.50	1/2-3/2	0.0277
	3780.8 (54)	22.67	7/2-7/2	0.131
	3826.8	22.69	5/2-5/2	0.0883
	3872.2	22.71	3/2-3/2	0.0615
	3880.3	22.74	1/2-1/2	0.0767
	3763.5	22.69	7/2-5/2	0.0217
	3799.4	22.71	5/2-3/2	0.0355
	3841.5	22.74	3/2-1/2	0.0382
	3844.8	22.67	5/2-7/2	0.0293
	3900.6	22.69	3/2-5/2	0.0541
	3911.6	22.71	1/2-3/2	0.0772
	3588.4 (56)	22.85	7/2-9/2	0.716
	3576.6	22.92	5/2-7/2	0.641
	3582.4	22.97	3/2-5/2	0.617
	3581.6	23.00	1/2-3/2	0.762
	3521.3	22.92	7/2-7/2	0.0790
	3520.0	22.97	5/2-5/2	0.132
	3548.5	23.00	3/2-3/2	0.151
	3466.3	22.97	7/2-5/2	0.00381
	3487.3	23.00	5/2-3/2	0.00706
	3371.0 (57)	23.07	7/2-5/2	0.00821
	3471.6	23.02	5/2-3/2	0.00610
	3569.9	22.98	3/2-1/2	0.00380
	3421.6	23.07	5/2-5/2	0.00251
	3532.2	23.02	3/2-3/2	0.00474
	3603.5	22.98	1/2-1/2	0.00766
	3480.5	23.07	3/2-5/2	0.000427
	3565.0	23.02	1/2-3/2	0.00150
	4103.9 (64)	22.60	5/2-3/2	0.152
	4077.0	22.70	3/2-1/2	0.118
	4218.7	22.60	3/2-3/2	0.0267
	3559.5 (70)	23.06	5/2-7/2	0.703
	3545.6	23.16	3/2-5/2	0.705
	3464.1	23.16	5/2-5/2	0.0326
	3137.7 (71)	23.53	5/2-3/2	0.00496
	3273.4	23.45	3/2-1/2	0.00501
	3204.3	23.53	3/2-3/2	0.000873
	3000.5 (72)	23.79	3/2-3/2	0.0368
	3014.5	23.77	3/2-5/2	0.00436
	4374.9 (77)	22.60	3/2-3/2	0.143

Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
A II	4129.7 (77)	22.70	1/2-1/2	0.0971
	4222.7	22.70	3/2-1/2	0.0255
	4275.2	22.60	1/2-3/2	0.0547
	3293.7 (83)	23.53	3/2-3/2	0.117
	3307.2	23.45	1/2-1/2	0.102
	3366.6	23.45	3/2-1/2	0.0265
	3236.8	23.53	1/2-3/2	0.0448
	4866.0 (85)	22.42	3/2-5/2	0.106
	4721.6	22.50	3/2-3/2	0.0666
	4564.4	22.59	3/2-1/2	0.0308
	3868.5 (90)	23.07	3/2-5/2	0.476
	3932.6	23.02	3/2-3/2	0.327
	3979.4	22.98	3/2-1/2	0.166
	4543.9 (95)	22.60	1/2-3/2	0.122
	3388.5 (96)	23.53	1/2-3/2	0.397
	3465.8	23.45	1/2-1/2	0.224
	4052.9 (101)	23.70	1/2-3/2	0.739
	3994.8	23.74	1/2-1/2	0.374
	3946.1 (105)	24.18	7/2-5/2	0.151
	3925.7	24.18	5/2-3/2	0.139
	3561.0 (106)	24.52	7/2-9/2	0.723
	3545.8	24.52	5/2-7/2	0.742
	3562.2	24.52	7/2-7/2	0.0207
	3429.6 (107)	24.65	7/2-5/2	0.0256
	3432.6	24.63	5/2-3/2	0.0241
	3414.5	24.65	5/2-5/2	0.00170
	3376.5 (109)	24.71	7/2-7/2	0.166
	3350.9	24.72	5/2-5/2	0.162
	3365.5	24.72	7/2-5/2	0.00610
	3361.7	24.71	5/2-7/2	0.00817
	4227.0 (113)	24.18	3/2-5/2	0.154
	4337.1	24.18	1/2-3/2	0.178
	4226.7	24.18	3/2-3/2	0.0171
	3600.2 (115)	24.69	3/2-3/2	0.347
	3754.1	24.62	1/2-1/2	0.293
	3671.0	24.62	3/2-1/2	0.0721
	3680.1	24.69	1/2-3/2	0.142
	3639.9 (116)	24.65	3/2-5/2	0.298
	3660.4	24.63	3/2-3/2	0.0335
	3026.8 (120)	25.34	3/2-1/2	0.0801
	3083.0	25.34	1/2-1/2	0.0845
	4448.9 (127)	24.18	5/2-5/2	0.173
	4439.5	24.18	3/2-3/2	0.166
	4448.5	24.18	5/2-3/2	0.0124
	4440.1	24.18	3/2-5/2	0.0185
	3830.4 (128)	24.62	3/2-1/2	0.0744
	3753.5	24.69	3/2-3/2	0.0144
	3803.2 (129)	24.65	5/2-5/2	0.320
	3819.0	24.63	3/2-3/2	0.333

	Wavelength [Å][4]		E[2]	J-J'[3]	$f_{J'J}$
A II	3825.7	(129)	24.63	5/2-3/2	0.0231
	3796.6		24.65	3/2-5/2	0.0343
	3737.9	(131)	24.71	5/2-7/2	0.508
	3718.2		24.72	3/2-5/2	0.529
	3724.5		24.72	5/2-5/2	0.0252
	6985.7	(137)	25.24	3/2-3/2	0.0294
K I	7664.9	(1)	1.61	1/2-3/2	0.655
	7699.0		1.60	1/2-1/2	0.326
	4044.1	(3)	3.05	1/2-3/2	0.0101
	4047.2		3.05	1/2-1/2	0.00473
	3446.4	(4)	3.58	1/2-3/2	0.00180
	3447.4		3.58	1/2-1/2	0.000838
	12523.0	(5)	2.60	3/2-1/2	0.167
	12434.3		2.60	1/2-1/2	0.166
	11772.7	(6)	2.66	3/2-5/2	0.751
	11689.8		2.66	1/2-3/2	0.836
	11769.4		2.66	3/2-3/2	0.0835
	6964.7	(7)	3.38	3/2-5/2	0.000009
	6936.3		3.38	1/2-3/2	0.000050
	6964.2		3.38	3/2-3/2	0.000001
	11022.3	(9)	3.78	3/2-5/2	0.184
	9595.6	(10)	3.94	5/2-7/2	0.0706
	9595.6		3.94	5/2-5/2	0.00353
	9597.8		3.94	3/2-5/2	0.0741
K III	3322.4	(1)	29.32	5/2-5/2	0.212
	3420.8		29.37	3/2-3/2	0.0398
	3278.8		29.37	5/2-3/2	0.0921
	3468.3		29.32	3/2-5/2	0.132
	3513.9		29.37	1/2-3/2	0.244
	2992.2	(2)	29.73	5/2-7/2	0.451
	3052.1		29.81	3/2-5/2	0.354
	3056.8		29.90	1/2-3/2	0.283
	3289.1	(4)	30.01	3/2-5/2	0.492
	3421.8		30.05	1/2-3/2	0.534
	3202.0	(5)	30.12	3/2-3/2	0.281
	3209.3		30.29	1/2-1/2	0.229
	3364.2		30.12	1/2-3/2	0.109
Ca I	4226.7	(2)	2.92	0 - 1	1.833
	6162.2	(3)	3.89	2 - 1	0.0780
	6122.2		3.89	1 - 1	0.0770
	6102.7		3.89	0 - 1	0.0765
	4454.8	(4)	4.66	2 - 3	0.255
	4435.0		4.66	1 - 2	0.226

	Wavelength [Å][4]		E[2]	J-J'[3]	$f_{J'J}$
Ca I	4425.4	(4)	4.66	0 - 1	0.300
	4455.9		4.66	2 - 2	0.0457
	4435.7		4.66	1 - 1	0.0755
	4456.6		4.66	2 - 1	0.00305
	3973.7	(6)	5.00	2 - 1	0.00928
	3957.1		5.00	1 - 1	0.00918
	3948.9		5.00	0 - 1	0.00914
	3644.4	(9)	5.28	2 - 3	0.0749
	3630.7		5.28	1 - 2	0.0666
	3624.1		5.28	0 - 1	0.0887
	3644.8		5.28	2 - 2	0.0134
	3631.0		5.28	1 - 1	0.0222
	3645.0		5.28	2 - 1	0.000895
	3487.6	(10)	5.43	2 - 1	0.00313
	3474.8		5.43	1 - 1	0.00310
	3468.5		5.43	0 - 1	0.00308
	3361.9	(11)	5.56	2 - 3	0.0350
	3350.2		5.56	1 - 2	0.0312
	3344.5		5.56	0 - 1	0.0416
	3362.1		5.56	2 - 2	0.00627
	3350.4		5.56	1 - 1	0.0104
	3362.3		5.56	2 - 1	0.000418
	3286.1	(12)	5.65	2 - 1	0.00148
	3274.7		5.65	1 - 1	0.00147
	3269.1		5.65	0 - 1	0.00146
	6169.6	(20)	4.52	3 - 2	0.000680
	6169.1		4.51	2 - 1	0.000528
	6166.4		4.51	1 - 0	0.000396
	6161.3		4.52	2 - 2	0.000171
	6163.8		4.51	1 - 1	0.000294
	6156.1		4.52	1 - 2	0.000019
	4585.9	(23)	5.21	3 - 4	0.0812
	4581.4		5.21	2 - 3	0.0791
	4578.6		5.21	1 - 2	0.0894
	4585.9		5.21	3 - 3	0.00700
	4098.5	(25)	5.53	3 - 4	0.0189
	4094.9		5.53	2 - 3	0.0184
	4092.6		5.53	1 - 2	0.0208
	4878.1	(35)	5.23	2 - 3	0.225
	4355.1	(37)	5.53	2 - 3	0.0832
	10343.9	(43)	4.11	1 - 0	0.142
	7326.1	(44)	4.60	1 - 2	0.622
	5513.0	(48)	5.16	1 - 0	0.00372
	5188.8	(49)	5.30	1 - 2	0.0323
	4847.3	(50)	5.47	1 - 0	0.000302
	4685.3	(51)	5.55	1 - 2	0.00549

	Wavelength [Å][4]		E[2]	J-J'[3]	$f_{J'J}$
Ca I	6343.3	(53)	6.37	3 - 4	0.406
	6318.1		6.36	2 - 3	0.434
	5757.7	(54)	6.57	4 - 4	0.0289
	5735.7		6.57	3 - 3	0.0259
	5718.0		6.57	2 - 2	0.0281
	5761.9		6.57	4 - 3	0.00196
	5746.8		6.57	3 - 2	0.00256
	5731.7	(54)	6.57	3 - 4	0.00243
	5707.0		6.57	2 - 3	0.00335
Ca II	3933.7	(1)	3.14	1/2-3/2	0.663
	3968.5		3.11	1/2-1/2	0.329
	8542.1	(2)	3.14	5/2-3/2	0.0485
	8662.1		3.11	3/2-1/2	0.0399
	8498.0		3.14	3/2-3/2	0.00809
	3736.9	(3)	6.44	3/2-1/2	0.155
	3706.0		6.44	1/2-1/2	0.153
	3179.3	(4)	7.02	3/2-5/2	0.809
	3158.9		7.02	1/2-3/2	0.894
	3181.3		7.02	3/2-3/2	0.0900
	11836.4	(5)	7.48	1/2-3/2	0.978
	11947.0		7.47	1/2-1/2	0.485
	4472.1	(6)	9.20	1/2-3/2	0.00122
	4479.3		9.20	1/2-1/2	0.000431
	4722.6	(7)	9.63	5/2-7/2	0.000861
	4722.6		9.63	5/2-5/2	0.000043
	4718.2		9.63	3/2-5/2	0.000971
	3758.4	(8)	10.30	5/2-7/2	0.00127
	3758.4		10.30	5/2-5/2	0.000063
	3755.6		10.30	3/2-5/2	0.00128
	3347.0	(9)	10.71	5/2-7/2	0.00219
	3347.0		10.71	5/2-5/2	0.000110
	9933.3	(12)	8.73	3/2-1/2	0.284
	9856.7		8.73	1/2-1/2	0.281
	8250.2	(13)	8.98	3/2-5/2	0.932
	8203.2		8.98	1/2-3/2	1.028
	8256.1		8.98	3/2-3/2	0.104
	5307.3	(14)	9.81	3/2-1/2	0.0325
	5285.3		9.81	1/2-1/2	0.0325
	5020.0	(15)	9.94	3/2-5/2	0.133
	5001.5		9.94	1/2-3/2	0.148
	5021.1		9.94	3/2-3/2	0.0148
	4220.1		10.41	3/2-1/2	0.0114
	4206.2		10.41	1/2-1/2	0.0114
	4109.8	(17)	10.49	3/2-5/2	0.0445
	4097.1		10.49	1/2-3/2	0.0498
	4110.3		10.49	3/2-3/2	0.00493

TABLE OF ABSORPTION OSCILLATOR STRENGTHS $f_{J'J}$ FOR ULTRAVIOLET LINES FROM THE COULOMB APPROXIMATION

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J'J}$
Li I	2741.2	(1)	4.50	1/2-3/2	0.00304
	2741.2		4.50	1/2-1/2	0.00152
	2562.3	(2)	4.82	1/2-3/2	0.00122
	2562.3		4.82	1/2-1/2	0.000611
Li II	199.3	(1)	61.95	0 - 1	0.431
	178.0	(2)	69.35	0 - 1	0.102
	171.6	(3)	71.95	0 - 1	0.0402
	2674.4	(4)	73.10	1 - 2	0.0344
	2674.4		73.10	1 - 1	0.0206
	2674.4		73.10	1 - 0	0.00687
Be I	2348.6	(1)	5.25	0 - 1	1.593
	2494.7	(3)	7.66	2 - 3	0.133
	2494.7		7.66	2 - 2	0.0238
	2494.6		7.66	1 - 2	0.119
	2494.6		7.66	1 - 1	0.0396
	2494.5		7.66	0 - 1	0.158
Be II	1036.3	(1)	11.91	1/2-3/2	0.0560
	842.1	(2)	14.66	1/2-3/2	0.0208
	842.1		14.66	1/2-1/2	0.0104
	1776.3	(3)	10.89	3/2-1/2	0.0641
	1776.1		10.89	1/2-1/2	0.0641
	1512.5	(4)	12.10	3/2-5/2	0.576
	1512.5		12.10	3/2-3/2	0.0640
	1512.3		12.10	1/2-3/2	0.640
	1197.2	(5)	14.25	3/2-1/2	0.0100
	2453.9	(6)	15.92	1/2-3/2	0.0204
	2453.9		15.92	1/2-1/2	0.0102
	2728.8	(7)	16.63	3/2-5/2	0.0529
B I	2497.7	(1)	4.94	3/2-1/2	0.0222
	2496.8		4.94	1/2-1/2	0.0221
	1826.4	(3)	6.76	3/2-5/2	0.0118
	1825.9		6.76	1/2-3/2	0.0131
B II	1362.5	(1)	9.06	0 - 1	1.368
	694.0	(2)	17.79	0 - 1	0.125
C I	1657.0	(2)	7.46	2 - 2	0.0175
	1657.4		7.45	1 - 1	0.0059
	1658.1		7.45	2 - 1	0.0059
	1657.9		7.45	1 - 0	0.0079
	1656.3	(2)	7.46	1 - 2	0.0097
	1656.9		7.45	0 - 1	0.0234
C I	1280.3	(5)	9.65	2 - 2	0.00214
	1280.3		9.64	1 - 1	0.00072
	1280.9		9.64	2 - 1	0.00072
	1280.6		9.64	1 - 0	0.00097
	1279.9		9.65	1 - 2	0.00119
	1280.2		9.64	0 - 1	0.00290
	1277.6	(7)	9.67	2 - 3	0.0142
	1277.3		9.67	1 - 2	0.0124
	1277.2		9.67	0 - 1	0.0162
	1277.8		9.67	2 - 2	0.0025
	1261.6	(9)	9.79	2 - 2	0.0358
	1261.0		9.79	1 - 1	0.0125
	1261.1		9.79	1 - 2	0.0200
	1260.7		9.79	0 - 1	0.0500
	1189.7	(14)	10.38	2 - 2	0.0092
	1189.1		10.38	1 - 1	0.0033
	1189.6		10.38	2 - 1	0.0033
	1188.9		10.38	0 - 1	0.0130
C II	858.6	(4)	14.39	3/2-1/2	0.0230
	858.1		14.39	1/2-1/2	0.0229
	687.4	(5)	17.97	3/2-5/2	0.157
	687.1		17.97	1/2-3/2	0.174
	806.6	(8)	20.62	5/2-5/2	0.0142
	806.7		20.61	3/2-3/2	0.00272
	806.7		20.61	1/2-1/2	0.00341
	806.8		20.61	5/2-3/2	0.00613
	806.8		20.61	3/2-1/2	0.00852
	806.4		20.62	3/2-5/2	0.00915
	806.6		20.61	1/2-3/2	0.0170
	651.3	(9)	24.27	5/2-7/2	0.104
	651.3		24.27	3/2-5/2	0.0822
	651.2		24.27	1/2-3/2	0.0653
	651.3		24.27	3/2-3/2	0.0418
	651.2		24.26	1/2-1/2	0.0654
	2747.3	(15)	20.75	3/2-5/2	0.0791
	2746.5		20.75	1/2-3/2	0.0877
C III	977.0	(1)	12.64	0 - 1	1.078
	386.2	(2)	31.97	0 - 1	0.255
	310.2	(3)	39.80	0 - 1	0.0162
	538.3	(5)	29.39	2 - 1	0.0307
	538.2		29.39	1 - 1	0.0306
	538.1		29.39	0 - 1	0.0306
C III	459.6	(6)	33.33	2 - 3	0.351
	459.6		33.33	2 - 2	0.0626
	459.5		33.33	1 - 2	0.313
	459.5		33.33	1 - 1	0.104
	459.5		33.33	0 - 1	0.417
	371.7	(7)	39.67	2 - 3	0.0996
	371.7		39.67	1 - 2	0.0890
	371.7		39.66	0 - 1	0.119
	371.8		39.67	2 - 2	0.0178
	690.5	(10)	30.51	1 - 0	0.0529
	574.3	(11)	34.13	1 - 2	0.517
C IV	1548.2	(1)	7.97	1/2-3/2	0.190
	1550.8		7.96	1/2-1/2	0.0948
	312.4	(2)	39.51	1/2-3/2	0.135
	312.5		39.51	1/2-1/2	0.0677
	244.9	(3)	50.41	1/2-3/2	0.0398
	244.9		50.41	1/2-1/2	0.0199
	222.8	(4)	55.41	1/2-3/2	0.0175
	222.8		55.41	1/2-1/2	0.00876
	419.7	(6)	37.39	3/2-1/2	0.0394
	419.5		37.39	1/2-1/2	0.0393
	384.2	(7)	40.11	3/2-5/2	0.594
	384.0		40.11	1/2-3/2	0.659
	297.0	(8)	49.55	3/2-1/2	0.00772
	296.9		49.55	1/2-1/2	0.00771
	289.2	(9)	50.66	3/2-5/2	0.108
	289.1		50.66	1/2-3/2	0.0599
	259.5	(10)	55.54	3/2-5/2	0.0344
	259.5		55.54	1/2-3/2	0.0383
	2698.7	(12)	54.98	3/2-1/2	0.149
	2697.7		54.98	1/2-1/2	0.148
	2595.1	(13)	55.41	3/2-1/2	0.0452
	2524.4	(14)	55.54	3/2-5/2	0.995
N I	1199.6	(1)	10.29	3/2-5/2	0.00243
	1200.2		10.29	3/2-3/2	0.00162
	1200.7		10.28	3/2-1/2	0.000815
	965.9	(3)	12.81	3/2-5/2	0.000289
	964.6		12.80	3/2-3/2	0.000200
	965.1		12.79	3/2-1/2	0.000102
	1492.6	(4)	10.64	5/2-5/2	0.00450
	1492.6		10.64	3/2-3/2	0.000751
	1494.7		10.63	3/2-1/2	0.00382
	1243.2	(5)	12.30	5/2-5/2	0.00106
	1243.2		12.30	3/2-5/2	0.000114
	1243.3		12.30	5/2-3/2	0.000076
	1243.3		12.30	3/2-3/2	0.00102

1/ The number in parentheses is the multiplet number.
2/ Excitation potential of the upper level of the line [in Volts].
3/ Total angular momentum quantum number of lower and upper levels.

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J}$
N I	1167.4	(6)	12.95	5/2-7/2	0.00851
	1168.5		12.94	5/2-5/2	0.000804
	1168.5		12.94	3/2-5/2	0.0169
	1163.9	(7)	12.98	5/2-5/2	0.000301
	1163.9		12.98	3/2-5/2	0.000132
	1164.3		12.98	5/2-3/2	0.000019
	1164.3		12.98	3/2-3/2	0.000140
	1742.7	(9)	10.64	3/2-3/2	0.00992
	1742.7		10.64	1/2-3/2	0.00397
	1745.2		10.63	3/2-1/2	0.00201
	1745.2		10.63	1/2-1/2	0.00804
	1411.9	(10)	12.30	1/2-3/2	0.0139
	1326.6	(11)	12.87	3/2-3/2	0.00127
	1326.6		12.87	1/2-3/2	0.000507
	1328.0		12.86	3/2-1/2	0.000259
	1328.0		12.86	1/2-1/2	0.00104
	1319.7	(12)	12.91	3/2-3/2	0.000561
	1319.7		12.91	1/2-3/2	0.000224
	1319.0		12.92	3/2-1/2	0.000136
	1319.0		12.92	1/2-1/2	0.000544
	1310.6	(13)	12.98	3/2-5/2	0.0111
	1311.0		12.98	3/2-3/2	0.00117
	1311.0		12.98	1/2-3/2	0.0117
N II	671.4	(3)	18.40	2 - 2	0.0233
	671.6		18.39	1 - 1	0.00785
	672.0		18.39	2 - 1	0.00785
	671.8		18.38	1 - 0	0.0105
	671.0		18.40	1 - 2	0.0129
	671.4		18.39	0 - 1	0.0313
	533.7	(5)	23.15	2 - 3	0.113
	533.6		23.14	1 - 2	0.101
	533.5		23.14	0 - 1	0.135
	533.8		23.14	2 - 2	0.0203
	533.6		23.14	1 - 1	0.0339
	529.9	(6)	23.31	2 - 2	0.0259
	529.5		23.32	1 - 1	0.00851
	529.7		23.32	2 - 1	0.00853
	529.4		23.32	1 - 0	0.0113
	529.6		23.31	1 - 2	0.0144
	529.3		23.32	0 - 1	0.0340
	747.0	(8)	18.42	2 - 1	0.0452
	582.2	(10)	23.10	2 - 2	0.0358
	574.7	(11)	23.37	2 - 3	0.145
	635.2	(13)	23.47	0 - 1	0.210
	1886.8	(14)	24.96	1 - 1	0.0167
	2206.1	(15)	25.92	1 - 2	0.00679
	2317.0	(16)	25.90	3 - 4	0.0180
	2316.5		25.89	2 - 3	0.0190
	2316.7		25.88	1 - 2	0.0227

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J}$
N II	2522.3	(19)	25.96	2 - 3	0.0255
	2520.9		25.96	1 - 2	0.0253
	2520.3		25.95	0 - 1	0.0318
	2496.9	(20)	26.01	2 - 2	0.00440
	2490.4		26.02	1 - 1	0.00135
	2799.2	(21)	25.92	2 - 2	0.0184
	2709.8	(22)	26.06	2 - 3	0.0366
	2461.3	(23)	26.52	2 - 1	0.0209
N III	452.2	(4)	27.32	3/2-1/2	0.0250
	451.9		27.32	1/2-1/2	0.0249
	374.4	(5)	32.99	3/2-5/2	0.253
	374.2		32.99	1/2-3/2	0.281
	314.9	(7)	39.23	3/2-5/2	0.0915
	314.7		39.23	1/2-3/2	0.102
	314.9		39.23	3/2-3/2	0.0102
	434.1	(9)	35.52	5/2-5/2	0.0306
	434.1		35.50	3/2-3/2	0.00585
	434.1		35.50	1/2-1/2	0.00733
	434.3		35.50	5/2-3/2	0.0132
	434.2		35.50	3/2-1/2	0.0183
	433.9		35.52	3/2-5/2	0.0196
	434.0		35.50	1/2-3/2	0.0365
	362.9	(10)	41.09	5/2-7/2	0.533
	362.9		41.09	3/2-5/2	0.263
	362.8		41.09	1/2-3/2	0.209
	363.0		41.09	5/2-5/2	0.0751
	362.9		41.09	3/2-3/2	0.134
	362.8		41.08	1/2-1/2	0.209
	358.6	(11)	41.51	5/2-5/2	0.0846
	358.4		41.51	3/2-3/2	0.0161
	358.3		41.52	1/2-1/2	0.0200
	358.5		41.51	5/2-3/2	0.0362
	358.4		41.52	3/2-1/2	0.0501
	358.5		41.51	3/2-5/2	0.0543
	358.3		41.51	1/2-3/2	0.100
	509.6	(14)	36.70	5/2-3/2	0.0585
	509.9		36.68	3/2-1/2	0.0491
	428.2	(15)	41.30	5/2-5/2	0.102
	428.2		41.30	3/2-3/2	0.0983
	418.7	(16)	41.96	5/2-7/2	0.472
	418.9		41.94	3/2-5/2	0.498
	472.4	(18)	42.31	1/2-3/2	0.439
	472.2		42.31	1/2-1/2	0.227
	2714.0	(21)	32.99	3/2-5/2	0.397
	2714.1		32.99	1/2-3/2	0.442
	1805.5	(22)	37.17	3/2-1/2	0.111
	1804.3		37.17	1/2-1/2	0.110
	2247.9	(23)	38.48	5/2-3/2	0.0532
	2248.9		38.48	3/2-1/2	0.0445

	Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J,J}$
N III	1885.5	(24)	39.54	3/2-5/2	0.933
	2983.6	(25)	42.31	3/2-3/2	0.153
	2972.6		42.31	1/2-1/2	0.123
	1908.1	(27)	47.77	5/2-7/2	0.799
	1908.1		47.77	3/2-5/2	0.839
	2455.9	(28)	46.53	5/2-7/2	0.00176
	2462.6		46.52	3/2-5/2	0.00140
	2468.4		46.52	1/2-3/2	0.00112
	1920.9	(29)	47.93	5/2-7/2	0.755
	1921.5		47.94	3/2-5/2	0.594
	1920.9		47.94	1/2-3/2	0.471
	2064.0	(30)	47.93	7/2-9/2	0.899
	2063.5		47.92	5/2-7/2	0.926
	2068.3		47.92	7/2-7/2	0.0258
N IV	765.1	(1)	16.13	0 - 1	0.880
	247.2	(2)	49.98	0 - 1	0.554
	322.7	(4)	46.57	2 - 1	0.0280
	322.6		46.57	1 - 1	0.0279
	322.5		46.57	0 - 1	0.0279
	283.6	(5)	51.85	2 - 3	0.599
	283.5		51.85	1 - 2	0.356
	283.4		51.85	0 - 1	0.475
	225.0	(6)	63.13	2 - 3	0.100
	225.1		63.13	1 - 2	0.0893
	225.1		63.13	0 - 1	0.119
	387.4	(9)	48.00	1 - 0	0.0430
	335.1	(10)	52.98	1 - 2	0.548
	345.1	(13)	57.46	2 - 2	0.0457
	345.1		57.44	1 - 1	0.0153
	303.1	(14)	62.41	2 - 3	0.626
	303.0		62.41	1 - 2	0.559
	303.0		62.40	0 - 1	0.746
	303.2		62.41	2 - 2	0.112
	303.1		62.40	1 - 1	0.186
	297.8	(15)	63.14	2 - 2	0.167
	297.6		63.14	1 - 1	0.0555
	297.6		63.14	1 - 0	0.0740
	351.9	(16)	56.40	2 - 1	0.0542
	323.2	(17)	61.52	2 - 2	0.173
	315.1	(18)	62.50	2 - 3	0.875
N V	1238.8	(1)	9.97	1/2-3/2	0.157
	1242.8		9.93	1/2-1/2	0.0780
	209.3	(2)	58.99	1/2-3/2	0.156
	209.3		58.98	1/2-1/2	0.0784
	162.6	(3)	75.94	1/2-3/2	0.0446
	162.6		75.94	1/2-1/2	0.0223
	266.4	(4)	56.31	3/2-1/2	0.0321
	266.2		56.31	1/2-1/2	0.0320
	247.7	(5)	59.80	3/2-5/2	0.591

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J,J}$
N V	247.6	(5)	59.80	1/2-3/2	0.656
	186.2	(6)	76.28	3/2-5/2	0.109
	186.1		76.28	1/2-3/2	0.121
O I	1302.2	(2)	9.48	2 - 1	0.000031
	1304.9		9.48	1 - 1	0.000018
	1306.0		9.48	0 - 1	0.000040
	1039.2	(3)	11.88	2 - 1	0.000004
	1040.9		11.88	1 - 1	0.000002
	1041.7		11.88	0 - 1	0.000005
	1025.8	(4)	12.03	2 - 3	0.0468
	1025.8		12.03	2 - 2	0.00836
	1025.8		12.03	2 - 1	0.000558
	1027.4		12.03	1 - 2	0.0406
	1027.4		12.03	1 - 1	0.0135
	1028.2		12.03	0 - 1	0.0553
	988.8	(5)	12.49	2 - 3	0.00581
	990.2		12.49	1 - 2	0.00517
	990.8		12.49	0 - 1	0.00688
	1152.1	(6)	12.67	2 - 2	0.00633
	999.5	(7)	14.31	2 - 1	0.00333
	1217.6	(9)	14.31	0 - 1	0.00625
O II	539.1	(2)	22.90	3/2-5/2	0.0142
	539.5		22.88	3/2-3/2	0.00960
	539.9		22.87	3/2-1/2	0.00483
	430.2	(3)	28.70	3/2-5/2	0.0380
	430.0		28.71	3/2-3/2	0.0244
	429.9		28.71	3/2-1/2	0.0118
	616.3	(5)	23.34	5/2-3/2	0.0210
	617.1		23.32	3/2-1/2	0.0177
	616.4		23.34	3/2-3/2	0.00350
	555.1	(6)	25.55	5/2-5/2	0.0142
	555.1		25.55	5/2-3/2	0.00102
	555.1		25.55	3/2-5/2	0.00153
	555.1		25.55	3/2-3/2	0.0137
	485.1	(8)	28.76	5/2-7/2	0.0606
	485.5		28.74	3/2-5/2	0.0670
	484.0	(9)	28.82	5/2-3/2	0.000644
	483.8		28.83	3/2-1/2	0.000514
	481.6	(10)	28.94	5/2-5/2	0.00580
	481.8		28.94	3/2-3/2	0.00574
	672.9	(12)	23.34	3/2-3/2	0.0241
	672.9		23.34	1/2-3/2	0.00963
	673.8		23.32	3/2-1/2	0.00487
	673.8		23.32	1/2-1/2	0.0195
	600.6	(14)	25.55	1/2-3/2	0.0117
	518.2	(16)	28.82	3/2-3/2	0.0200
	518.2		28.82	1/2-3/2	0.00799
	517.9		28.83	3/2-1/2	0.00387

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J,J}$
O II	517.9	(16)	28.83	1/2-1/2	0.0155
	515.5	(17)	28.94	3/2-5/2	0.0468
	515.6		28.94	3/2-3/2	0.00530
	515.6		28.94	1/2-3/2	0.0530
	2733.3	(20)	29.69	1/2-3/2	0.0444
	2747.5		29.67	1/2-1/2	0.0231
O III	374.1	(4)	33.04	2 - 2	0.0280
	374.2		33.01	1 - 1	0.00942
	374.4		33.01	2 - 1	0.00945
	374.3		32.99	1 - 0	0.0126
	373.8		33.04	1 - 2	0.0155
	374.0		33.01	0 - 1	0.0376
	305.8	(5)	40.41	2 - 3	0.229
	305.7		40.40	1 - 2	0.205
	305.6		40.40	0 - 1	0.273
	305.8		40.40	2 - 2	0.0410
	305.7		40.40	1 - 1	0.0684
	305.9		40.40	2 - 1	0.00273
	303.8	(6)	40.67	2 - 2	0.0609
	303.5		40.69	1 - 1	0.0201
	303.7		40.69	2 - 1	0.0202
	303.5		40.69	1 - 0	0.0267
	303.6		40.67	1 - 2	0.0338
	303.4		40.69	0 - 1	0.0804
	395.6	(9)	33.71	2 - 1	0.0393
	328.4	(10)	40.09	2 - 2	0.0713
	321.0	(11)	40.96	2 - 3	0.281
	435.0	(14)	33.71	0 - 1	0.0561
	345.3	(15)	41.08	0 - 1	0.384
	2983.8	(18)	37.85	1 - 2	0.509
	2455.0	(19)	38.74	1 - 0	0.123
	2597.7	(20)	45.42	2 - 1	0.0552
	2605.4		45.42	1 - 1	0.0556
	2558.1	(21)	45.79	3 - 2	0.0868
	2686.1	(22)	46.37	3 - 2	0.107
	2674.6		46.37	2 - 2	0.107
	2665.7		46.37	1 - 2	0.107
	2695.5	(23)	49.42	1 - 2	0.379
	2687.5		49.44	1 - 1	0.229
	2683.7		49.44	1 - 0	0.0764
O IV	279.9	(4)	44.15	3/2-1/2	0.0243
	279.6		44.15	1/2-1/2	0.0242
	238.6	(5)	51.79	3/2-5/2	0.322
	238.4		51.79	1/2-3/2	0.357
	233.6	(7)	61.68	5/2-7/2	0.426
	233.5		61.67	3/2-5/2	0.336
	233.5		61.67	1/2-3/2	0.266
	233.5		61.67	1/2-1/2	0.267
	260.4	(9)	63.08	5/2-7/2	0.582

	Wavelength [Å][1]		E^{2}	J-J'[3]	$f_{J,J}$
O III	260.6	(9)	63.05	3/2-5/2	0.614
O V	629.7	(1)	19.60	0 - 1	0.738
	171.2	(2)	71.70	0 - 1	0.424
	215.2	(4)	67.55	2 - 1	0.0258
	215.1		67.55	1 - 1	0.0258
	215.0		67.55	0 - 1	0.0257
	192.9	(5)	74.19	2 - 3	0.429
	192.8		74.19	1 - 2	0.382
	192.8		74.18	0 - 1	0.510
	248.5	(9)	69.29	1 - 0	0.0369
	220.4	(10)	75.63	1 - 2	0.563
	203.9	(13)	86.97	2 - 3	0.665
	203.8		86.96	1 - 2	0.594
	203.8		86.95	0 - 1	0.792
	216.0	(15)	85.75	2 - 2	0.180
	207.8	(16)	88.02	2 - 3	0.853
C VI	1031.9	(1)	11.96	1/2-3/2	0.133
	1037.6		11.90	1/2-1/2	0.0659
	150.1	(2)	82.25	1/2-3/2	0.175
	150.1		82.23	1/2-1/2	0.0878
	184.1	(3)	79.01	3/2-1/2	0.0289
	183.9		79.01	1/2-1/2	0.0288
	173.1	(4)	83.29	3/2-5/2	0.595
	172.9		83.28	1/2-3/2	0.661
	129.9	(5)	107.02	3/2-5/2	0.109
	129.8		107.02	1/2-3/2	0.121
Ne II	446.3	(3)	27.66	3/2-3/2	0.0145
	446.6		27.74	1/2-1/2	0.0113
	445.0	(3)	27.74	3/2-1/2	0.00279
	447.8		27.66	1/2-3/2	0.00590
	405.9	(4)	30.42	3/2-5/2	0.00581
	405.9		30.42	3/2-3/2	0.000646
	407.1		30.42	1/2-3/2	0.00659
	361.4	(5)	34.16	3/2-1/2	0.000539
	362.5		34.16	1/2-1/2	0.000552
	356.8	(6)	34.60	3/2-5/2	0.00446
	357.5		34.62	1/2-3/2	0.00382
	356.5		34.62	3/2-3/2	0.000350
	2955.7	(8)	31.23	5/2-3/2	0.109
	3011.7		31.23	3/2-3/2	0.108
	2792.1	(10)	34.81	5/2-5/2	0.0811
	2780.1		34.86	3/2-3/2	0.0150
	2770.1		34.90	1/2-1/2	0.0183
Ne III	313.0	(2)	39.44	2 - 1	0.0209
	313.7		39.44	1 - 1	0.0211
	313.9		39.44	0 - 1	0.0212
	283.2	(3)	43.60	2 - 3	0.0176
	283.7		43.60	1 - 2	0.0158

Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
Ne III	283.9 (3)	43.60	0 - 1	0.0212
	283.2	43.60	2 - 2	0.00314
	283.7	43.60	1 - 1	0.00528
	283.2	43.60	2 - 1	0.000218
	267.1 (4)	46.22	2 - 2	0.00726
	267.1	46.22	2 - 1	0.00242
	267.5	46.23	1 - 2	0.00407
	267.5	46.23	1 - 1	0.00244
	267.5	46.23	1 - 0	0.00325
	267.7	46.23	0 - 1	0.00978
	251.1 (5)	49.16	2 - 3	0.121
	251.1	49.16	2 - 2	0.0216
	251.1	49.16	2 - 1	0.00144
	251.6	49.16	1 - 2	0.108
	251.6	49.16	1 - 1	0.0361
	251.7	49.16	0 - 1	0.145
	301.1 (7)	44.19	2 - 2	0.0430
	282.5 (8)	46.89	2 - 1	0.0107
	308.6 (10)	46.89	0 - 1	0.0621
	2590.0 (11)	43.55	2 - 3	0.355
	2593.6	43.54	2 - 2	0.253
	2595.7	43.54	2 - 1	0.152
	2677.9 (12)	44.04	1 - 2	0.431
	2677.9	44.04	1 - 0	0.0862
	2678.6	44.04	1 - 1	0.259
Ne IV	208.5 (2)	59.21	3/2-5/2	0.0232
	208.7	59.14	3/2-3/2	0.0157
	208.9	59.10	3/2-1/2	0.00796
	172.6 (3)	71.52	3/2-5/2	0.266
	172.5	71.55	3/2-3/2	0.176
	172.5	71.57	3/2-1/2	0.0875
	212.6 (6)	65.13	3/2-3/2	0.0221
	194.3 (11)	71.22	1/2-3/2	0.290
Na I	2852.8 (1)	4.33	1/2-3/2	0.00150
	2853.0	4.33	1/2-1/2	0.000735
Mg I	2852.1 (1)	4.33	0 - 1	1.656
	2025.8 (2)	6.09	0 - 1	0.0955
	2942.0 (3)	6.90	2 - 1	0.00272
	2938.5	6.90	1 - 1	0.00272
	2936.7	6.90	0 - 1	0.00271
	2851.6 (5)	7.03	2 - 3	0.0404
	2848.3	7.03	1 - 2	0.0361
	2848.3	7.03	1 - 1	0.0120
	2846.7	7.03	0 - 1	0.0482
	2781.4 (7)	7.14	2 - 1	0.00129
	2778.3	7.14	1 - 1	0.00129
	2776.7	7.14	0 - 1	0.00129
Mg II	2795.5 (1)	4.41	1/2-3/2	0.595
Mg II	2802.7 (1)	4.40	1/2-1/2	0.297
	2936.5 (2)	8.62	3/2-1/2	0.139
	2928.6	8.62	1/2-1/2	0.138
	2798.0 (3)	8.83	3/2-5/2	0.832
	2790.8	8.83	1/2-3/2	0.924
	2660.8 (4)	13.46	5/2-7/2	0.0544
	2660.8	13.46	5/2-5/2	0.00272
	2660.8	13.46	3/2-5/2	0.0571
Al I	2660.4 (1)	4.65	3/2-1/2	0.00586
	2652.5	4.65	1/2-1/2	0.00582
	2575.1 (2)	4.81	3/2-5/2	0.0415
	2568.0	4.81	1/2-3/2	0.0464
	2575.4	4.81	3/2-3/2	0.00455
	2378.4 (3)	5.20	3/2-1/2	0.00194
	2372.1	5.20	1/2-1/2	0.00193
	2373.1 (4)	5.21	3/2-5/2	0.000410
	2367.1	5.21	1/2-3/2	0.000456
	2373.4	5.21	3/2-3/2	0.0000040
	2269.1 (5)	5.45	3/2-5/2	0.000145
	2263.5	5.45	1/2-3/2	0.000150
	2269.2	5.45	3/2-3/2	0.000011
	2263.7 (6)	5.47	3/2-1/2	0.000913
	2258.0	5.47	1/2-1/2	0.000906
	2372.1 (11)	8.80	5/2-7/2	0.262
	2369.3	8.80	3/2-5/2	0.207
	2367.6	8.80	1/2-3/2	0.165
	2373.5	8.80	5/2-5/2	0.0594
	2370.2	8.80	3/2-3/2	0.106
	2368.1	8.79	1/2-1/2	0.165
	2321.6 (12)	8.91	5/2-5/2	0.0542
	2315.0	8.92	3/2-3/2	0.0101
	2311.9	8.92	1/2-1/2	0.0124
Al II	1670.8 (2)	7.39	0 - 1	1.934
	1862.3 (4)	11.27	2 - 1	0.0803
	1858.1	11.27	1 - 1	0.0798
	1856.0	11.27	0 - 1	0.0796
	1725.0 (6)	11.80	2 - 1	0.00750
	1721.3	11.80	1 - 1	0.187
	1719.5	11.80	0 - 1	0.749
	2816.2 (7)	11.77	1 - 0	0.149
	1989.9 (8)	15.59	1 - 2	0.595
	1625.6 (9)	14.98	1 - 0	0.0157
	1539.7 (10)	15.41	1 - 2	0.0891
	2902.1 (13)	15.52	1 - 2	0.00290
	2903.2	15.52	1 - 1	0.00167
	2903.7	15.52	1 - 0	0.000549
	2637.7 (14)	16.47	3 - 4	0.166
	2638.3	16.47	2 - 3	0.160
Al II	2638.7 (14)	16.47	1 - 2	0.160
	2638.2	16.47	3 - 3	0.0143
	2638.6	16.47	2 - 2	0.0200
	2638.5	16.47	3 - 2	0.000409
Al III	1854.7 (1)	6.66	1/2-3/2	0.551
	1862.8	6.65	1/2-1/2	0.274
	695.8 (2)	17.74	1/2-3/2	0.00746
	696.2	17.73	1/2-1/2	0.00390
	560.4 (3)	22.03	1/2-3/2	0.00451
	560.4	22.03	1/2-1/2	0.00234
Si I	2516.1 (1)	4.93	2 - 2	0.0306
	2519.2	4.91	1 - 1	0.0105
	2528.5	4.91	2 - 1	0.0106
	2524.1	4.90	1 - 0	0.0141
	2506.9	4.93	1 - 2	0.0168
	2514.3	4.91	0 - 1	0.0415
	2216.7 (5)	5.59	2 - 3	0.391
	2210.9	5.59	1 - 2	0.348
	2208.0	5.59	0 - 1	0.463
	2218.1	5.59	2 - 2	0.0697
	2211.7	5.59	1 - 1	0.116
	2218.9	5.59	2 - 1	0.00464
	1988.4 (7)	6.23	2 - 2	0.0705
	1980.0	6.24	1 - 1	0.0228
	1985.7	6.24	2 - 1	0.0230
	1978.6	6.25	1 - 0	0.0301
	1982.6	6.23	1 - 2	0.0389
	1977.0	6.24	0 - 1	0.0910
	1850.7 (10)	6.70	2 - 3	0.000141
	1847.5	6.69	1 - 2	0.000001
	1845.5	6.69	0 - 1	0.000011
	1852.5	6.69	2 - 2	0.000000
	1848.2	6.69	1 - 1	0.000005
	1853.2	6.69	2 - 1	0.000000
	1841.5 (11)	6.73	2 - 2	0.00340
	1843.8	6.71	1 - 1	0.00127
	1848.8	6.71	2 - 1	0.00128
	1846.1	6.70	1 - 0	0.00175
	1836.5	6.73	1 - 2	0.00186
	1841.2	6.71	0 - 1	0.00505
	1698.0 (18)	7.30	2 - 3	0.000064
	1696.2	7.29	1 - 2	0.000330
	1693.3	7.29	0 - 1	0.000134
	1700.4	7.29	2 - 2	0.000075
	1695.5	7.29	1 - 1	0.000038
	1699.7	7.29	2 - 1	0.000002
	1686.8 (21)	7.35	2 - 2	0.000907
	1689.3	7.32	1 - 1	0.000408

	Wavelength [Å][1]	E[2]	J-J'[3]	$f_{J,J}$
Si I	1693.5 (21)	7.32	2 - 1	0.000412
	1690.8	7.31	1 - 0	0.000578
	1682.7	7.35	1 - 2	0.000497
	1687.1	7.32	0 - 1	0.00162
	1623.3 (29)	7.63	2 - 2	0.000220
	1625.6	7.60	1 - 1	0.000177
	1629.5	7.60	2 - 1	0.000179
	1627.0	7.60	1 - 0	0.000267
	1619.5	7.63	1 - 2	0.000120
	2881.6 (43)	5.06	2 - 1	0.0551
	2435.2 (45)	5.85	2 - 2	0.106
	2124.1 (48)	6.59	2 - 3	0.105
	2123.0 (49)	6.59	2 - 1	0.00121
	2058.1 (52)	6.77	2 - 1	0.00600
	1901.3 (57)	7.27	2 - 3	0.0177
	1874.9 (62)	7.36	2 - 1	0.00164
	1814.0 (68)	7.58	2 - 3	0.00123
	1799.1 (71)	7.64	2 - 1	0.000447
	2631.3 (83)	6.59	0 - 1	0.252
	2532.4 (86)	6.77	0 - 1	0.0111
	2259.6 (90)	7.36	0 - 1	0.00332
	2150.4 (95)	7.64	0 - 1	0.00121
Si II	1533.4 (2)	8.09	3/2-1/2	0.0650
	1526.7	8.09	1/2-1/2	0.0643
	1265.0 (4)	9.80	3/2-5/2	0.515
	1260.7	9.79	1/2-3/2	0.570
	993.1 (6)	12.47	3/2-5/2	0.0873
	990.3	12.47	1/2-3/2	0.0976
	1350.1 (7)	14.62	5/2-5/2	0.0654
	1350.6	14.60	3/2-3/2	0.0122
	1355.8	14.60	5/2-3/2	0.0277
	1352.7	14.58	3/2-1/2	0.0387
	1346.9	14.62	3/2-5/2	0.0405
	1348.6	14.60	1/2-3/2	0.0761
	2604.4 (15)	12.82	1/2-3/2	0.00114
	2606.1	12.82	1/2-1/2	0.000489
	2505.7 (17)	14.04	5/2-7/2	0.158
	2905.7	14.04	5/2-5/2	0.00788
	2904.3	14.04	3/2-5/2	0.166
	2502.0 (18)	14.73	5/2-7/2	0.0537
	2502.0	14.73	5/2-5/2	0.00269
	2501.0	14.73	3/2-5/2	0.0565
	2726.7 (19)	14.56	3/2-1/2	0.00885
	2722.3	14.56	1/2-1/2	0.00885
	2682.3 (20)	14.63	3/2-5/2	0.0526
	2682.3	14.63	3/2-3/2	0.00363
	2678.0	14.63	1/2-3/2	0.0366
Si III	1206.5 (2)	10.23	0 - 1	1.880
	566.5 (3)	21.79	0 - 1	0.0159

	Wavelength [Å][4]	E[2]	J-J'[3]	$f_{J,J}$
Si III	1113.2 (5)	17.63	2 - 3	0.666
	1113.2	17.63	2 - 2	0.119
	1113.2	17.63	2 - 1	0.00793
	1110.0	17.63	1 - 2	0.595
	1110.0	17.63	1 - 1	0.198
	1108.4	17.64	0 - 1	0.793
	997.4 (6)	18.92	2 - 1	0.0790
	994.8	18.92	1 - 1	0.0784
	993.5	18.92	0 - 1	0.0782
	2541.8 (8)	15.09	1 - 2	0.351
	1312.6 (10)	19.64	1 - 0	0.129
Si IV	1393.7 (1)	8.86	1/2-3/2	0.506
	1402.7	8.80	1/2-1/2	0.251
	457.7 (2)	26.97	1/2-3/2	0.0198
	457.7	26.97	1/2-1/2	0.0103
	1128.3 (3)	19.80	3/2-5/2	0.723
	1122.5	19.80	1/2-3/2	0.805
	818.1 (4)	23.95	3/2-1/2	0.109
	815.1	23.95	1/2-1/2	0.108
A II	723.4 (4)	17.07	3/2-3/2	0.0410
	725.5	17.19	1/2-1/2	0.0280
	718.1	17.19	3/2-1/2	0.00747
	730.9	17.07	1/2-3/2	0.0154
	671.9 (6)	18.37	5/2-5/2	0.0223
	679.4	18.35	1/2-3/2	0.0238
	672.8	18.35	3/2-3/2	0.00252
	661.9 (8)	18.65	3/2-5/2	0.786
	670.9	18.58	1/2-3/2	0.869
	664.6	18.58	3/2-3/2	0.0862
	597.7 (9)	20.65	3/2-1/2	0.00296
	602.9	20.65	1/2-1/2	0.00308
	580.3 (10)	21.27	3/2-5/2	0.161
	583.4	21.34	1/2-3/2	0.181
	578.6	21.34	3/2-3/2	0.0180
	573.4 (11)	21.53	3/2-3/2	0.198
	576.7	21.58	1/2-1/2	0.160
	572.0	21.58	3/2-1/2	0.0398
	578.1	21.53	1/2-3/2	0.0796
	519.3 (12)	23.77	3/2-5/2	0.00102
	522.8	23.79	1/2-3/2	0.00156
A III	690.2 (2)	17.89	2 - 3	0.401
	690.2	17.89	2 - 2	0.0716
	690.2	17.89	2 - 1	0.00477
	695.5	17.89	1 - 2	0.357
	695.5	17.89	1 - 1	0.119
	637.3 (3)	19.37	2 - 3	0.509
	641.8	19.37	1 - 2	0.454
	643.3	19.39	0 - 1	0.606

	Wavelength [Å][4]	E[2]	J-J'[3]	$f_{J,J}$
A III	637.3 (3)	19.37	2 - 2	0.0909
	641.4	19.39	1 - 1	0.152
	636.8	19.39	2 - 1	0.00607
	553.5 (4)	22.30	2 - 1	0.0470
	556.9	22.30	1 - 1	0.0480
	558.3	22.30	0 - 1	0.0485
	1669.7 (6)	25.28	4 - 3	0.0544
	1673.4	25.26	3 - 2	0.0364
	1675.6	25.25	2 - 1	0.0191
	1914.4 (7)	25.82	3 - 2	0.0707
	1915.6	25.82	2 - 1	0.0530
	2484.1 (8)	27.98	4 - 4	0.0274
	2508.9	27.96	3 - 3	0.0247
	2533.9	27.94	2 - 2	0.0262
	2724.8 (9)	27.83	3 - 3	0.0470
	2678.4	27.79	2 - 2	0.0363
	2631.9	27.80	1 - 1	0.0388
	2345.2 (10)	28.56	3 - 2	0.0315
	2282.2	28.59	2 - 1	0.0231
	2242.3	28.61	1 - 0	0.0168
A IV	2809.4 (4)	35.50	5/2-7/2	0.412
	2789.0	35.40	3/2-5/2	0.324
	2776.3	35.33	1/2-3/2	0.257
	2640.3 (5)	35.78	5/2-5/2	0.231
	2608.1	35.71	3/2-3/2	0.0441
	2757.9 (6)	37.58	5/2-7/2	0.419
	2784.5	37.54	3/2-5/2	0.436
A V	463.9 (4)	26.86	2 - 2	0.241
	459.7	26.95	1 - 1	0.0808
	462.4	26.95	2 - 1	0.0806
	461.2	26.86	1 - 2	0.134
	449.1 (5)	27.74	2 - 3	0.852
	446.9	27.72	1 - 2	0.761
	446.0	27.68	0 - 1	1.014
	538.0 (6)	36.77	2 - 2	0.0779
	350.9 (8)	37.20	2 - 1	0.112
K III	520.6 (2)	23.71	3/2-5/2	0.880
	529.8	23.57	1/2-3/2	0.961
	523.8	23.57	3/2-3/2	0.0961
	470.1 (4)	26.26	3/2-3/2	0.0642
	471.6	26.45	1/2-1/2	0.0444
	466.8	26.45	3/2-1/2	0.0118
	474.9	26.26	1/2-3/2	0.0242
	444.3 (5)	27.78	3/2-5/2	0.0355
	448.6	27.79	1/2-3/2	0.0371
	413.8 (6)	29.83	3/2-1/2	0.00714
	2992.2 (7)	29.73	5/2-7/2	0.451
	3052.1	29.81	3/2-5/2	0.354

Wavelength [Å][1]		E[2]	J-J'[3]	$f_{J'J}$
K III	3056.8 (7)	29.90	1/2-3/2	0.283
	2938.5	29.81	5/2-5/2	0.103
	2986.2	29.90	3/2-3/2	0.183
	2550.0 (8)	30.45	5/2-3/2	0.130
	2635.1	30.45	3/2-3/2	0.128
	2689.9	30.45	1/2-3/2	0.127
Ca I	2398.6 (5)	5.15	0 - 1	0.0276
	2275.5 (6)	5.42	0 - 1	0.0690
Ca II	1650.0 (1)	7.48	1/2-3/2	0.000229
	1652.0	7.47	1/2-1/2	0.000047
Ca II	2131.4 (3)	7.48	5/2-3/2	0.000178
	2132.3	7.47	3/2-1/2	0.000132
	2128.7	7.48	3/2-3/2	0.000031
	1840.2 (4)	8.40	5/2-7/2	0.0852
	1840.2	8.40	5/2-5/2	0.0426
	1838.1	8.40	3/2-5/2	0.0884
	1555.1 (6)	9.63	5/2-7/2	0.0362
	1555.1	9.63	5/2-5/2	0.00181
	1553.5	9.63	3/2-5/2	0.0377
	1434.3 (7)	10.30	5/2-7/2	0.0362
	1434.3	10.30	5/2-5/2	0.00181
Ca II	1433.1 (7)	10.30	3/2-5/2	0.0377
	2208.6 (8)	8.73	3/2-1/2	0.0194
	2197.8	8.73	1/2-1/2	0.0193
	2112.8 (9)	8.98	3/2-5/2	0.103
	2109.2	8.98	1/2-3/2	0.115
	2113.2	8.98	3/2-3/2	0.0114
	1851.1 (10)	9.81	3/2-1/2	0.00676
	1843.6	9.81	1/2-1/2	0.00675
	1815.0 (11)	9.94	3/2-5/2	0.0523
	1807.7	9.94	1/2-3/2	0.0362